The Mining Journal

London, June 23, 1961

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Another Aluminium Complex for Australia

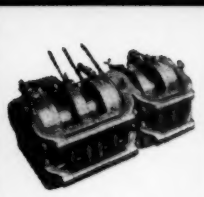
AS reported in our last week's issue, an integrated aluminium mining, smelting and fabricating industry is to be established in Australia by a company capitalized at £A40,000,000, which has been formed by Alcoa in conjunction with three Australian companies. Control of the new company, known as Alcoa (Australia) will be held by Alcoa with a 51 per cent interest, the remainder being shared by Western Mining, Broken Hill South and North Broken Hill.

Bauxite is to be mined in the Darling Ranges in Western Australia and refined at Kwinana, near Fremantle. Alumina will be transported for 1,700 miles by sea to Point Henry, near Geelong, Victoria, where a smelter and fabricating plant will be built. The smelter will have a capacity of 40,000 t.p.a. and should be in operation by 1964. The full extent of the deposits in the Darling Ranges has not yet been disclosed, but last September it was stated that the company had indicated reserves of 37,000,000 tons in what was only a minor part of the area known to contain bauxite. For power generation Alcoa will use extensive deposits of brown coal near Geelong, the rights of which are owned by Western Mining. The reserves are estimated at 400,000,000 tons grading 5,600 B.Th.U. per lb.

What makes the news of this major project so unexpected is that it comes little more than six months after the announcement that Kaiser Aluminium and Chemical Corporation was to be associated with Consolidated Zinc Corporation as an equal partner in the development of an integrated aluminium industry in Australia and New Zealand, embracing the production of alumina and aluminium as well as the establishment of fabricating facilities. Comalco Industries Pty. Ltd., owned jointly by Consolidated Zinc and Kaiser Aluminium, was registered in Melbourne early this year with a nominal capital of £25,000,000. The principal items in the integrated project are bauxite mining facilities, a 360,000 t.p.a alumina plant with associated facilities at Weipa in Queensland, the Manapouri power project, and a 120,000 ton aluminium reduction plant at Invercargill in Southland, New Zealand.

The programme agreed by Consolidated Zinc and Kaiser Aluminium also calls for continued studies of the possibilities of additions to Australia's domestic smelting capacity by further expansion of the Bell Bay aluminium plant. This smelter is now controlled by the Aluminium Production Corporation, in which Comalco has a two-thirds interest and the Tasmanian government a one-third interest. Bell Bay's capacity is to be expanded to 44,000 tons of primary aluminium instead of 28,000 tons, as announced a few months ago. The Tasmanian Premier, Mr. Reece, has promised to submit to Parliament plans for generating hydro-electric power in the Derwent Valley to increase production at Bell Bay.

Electric or Compressed Air Scraper Haulage Gears.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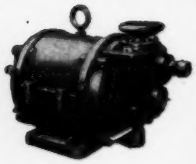
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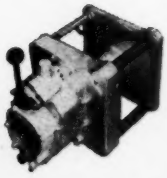
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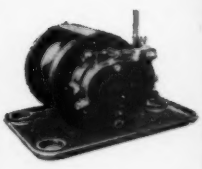
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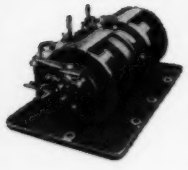
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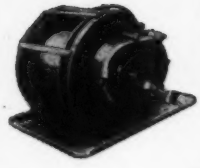
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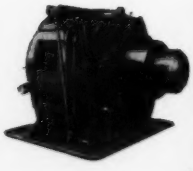
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Electric or Compressed Air Haulage Gears. (Two Speed or Single Speed)

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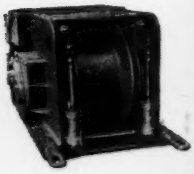
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Aluminium Ltd. and Reynolds Metal, the other two members of North America's " Big Four ", also have their eyes on Australia. Four experts from Alcan and British Aluminium, owners of the Australian Aluminium Co. Ltd., arrived in Sydney early in June to investigate the capital cost and commercial possibilities of setting up a smelter and an alumina plant. Hitherto Australian Aluminium has been purely a fabricating company. It will be recalled that last September the arrangement between Consolidated Zinc and British Aluminium for the joint development of the bauxite deposits in the Cape York Peninsula was terminated by mutual consent. British Aluminium, itself jointly owned by Reynolds Metal and Tube Investments, retained its ownership of the leases over bauxite deposits in the Gove Peninsula, Northern Territory, and assumed full ownership of the New Guinea Resources Prospecting Co., which own the rights to hydro-electric resources developments in Papua. The Alcan-British Aluminium axis is thus well placed in regard to both bauxite and power supplies to establish an aluminium smelter, assuming that it is still interested in doing so.

So far as Australia's own consumption of primary aluminium is concerned, there appears to be little likelihood of it rising rapidly enough in the foreseeable future to absorb the combined outputs of the Invercargill and expanded Bell Bay plants, so that the establishment of a third (and possibly even a fourth) smelter could scarcely be justified by domestic needs alone. A survey undertaken last year by the Department of Trade indicated that by 1965 Australian consumption of primary aluminium could rise to 47,000 tons—nearly double the 1957-58 figure. In a paper presented at a Symposium in Brisbane two years ago, Dr. J. A. Dunn expressed the opinion that a rise of consumption in Australia to 100,000 tons annually by the 1970's would not be out of balance, more especially when it is considered that the Commonwealth's *per capita* consumption of about 7 lb. annually is among the lowest of the Western countries, due largely to what has hitherto been an inadequate and high priced supply of domestic metal. The figure mentioned by Dr. Dunn, however, is substantially smaller than the projected output of Invercargill alone.

It is evident, therefore, that the major aluminium companies are not being attracted to Australia solely by the prospect of an expanding domestic market, or even by such natural advantages as abundant bauxite and the availability within economically feasible distances of potential sources of low-cost power, together with the absence of political risks. The chief magnet is probably Australia's proximity to the Eastern markets, still largely unexploited, in which the " Big Four " have latterly been taking a much more active interest. With the exception of India, which seeks to achieve self-sufficiency in primary aluminium by the end of the Third Year Plan, the underdeveloped countries of South East Asia with their low *per capita* consumption of metals could be rewarding markets for Australian smelters and fabricators. Mr. D. A. Rhoades, President of Kaiser Aluminium, anticipates that consumption in the Pacific area will have more than doubled by 1970. Moreover, Japan with her ambitious plans for the expansion of aluminium production, is a natural outlet for Australian bauxite, in which connection it is noteworthy that three leading Japanese aluminium makers are currently constructing or planning to build their own bauxite carriers of about 10,000 deadweight tons.

Apart from these more obvious outlets, Dr. Dunn has suggested that, in the latter part of the 1960's and the early 1970's, Australian alumina could well be competitive with alumina from the Caribbean, even in the American Pacific Coast, market.

There can be no doubt that, in planning for an initial capacity of 120,000 tons at Invercargill, Consolidated Zinc and Kaiser Aluminium visualize a large exportable surplus. Similarly the directors of Alcoa (Australia) have expressed their intention not only of meeting Australia's home demands but also of seeking export markets for alumina, aluminium and aluminium products.

Alcoa's programme is considerably smaller than that of Comalco Industries, but from comparison of announced schedules it looks as though the Point Henry smelter will come into operation some two years before Invercargill. It is scarcely possible to over-estimate the benefits to Australia of these two projects (with possibly another to follow), which will unquestionably become a valuable source of foreign exchange, besides assuring Australian fabricators and consumers of abundant supplies of one of the most versatile engineering and structural metals at extremely competitive prices.

The present situation in Australia reflects the increasingly severe competition which exists in the aluminium industry throughout the world, as well as the vigour with which the " Big Four " are seeking to increase their stake in every promising market. This agressive outlook which stems largely from the existence of so much excess capacity in North America, is not the least of the factors responsible for the rapid increase in Free World consumption. In the light of aluminium's past history it would certainly be rash to describe the Australian projects as excessively large, even when viewed in the aggregate, however ambitious they may seem in the light of present and predicted needs.

The financial aspects are considered further on page 738.

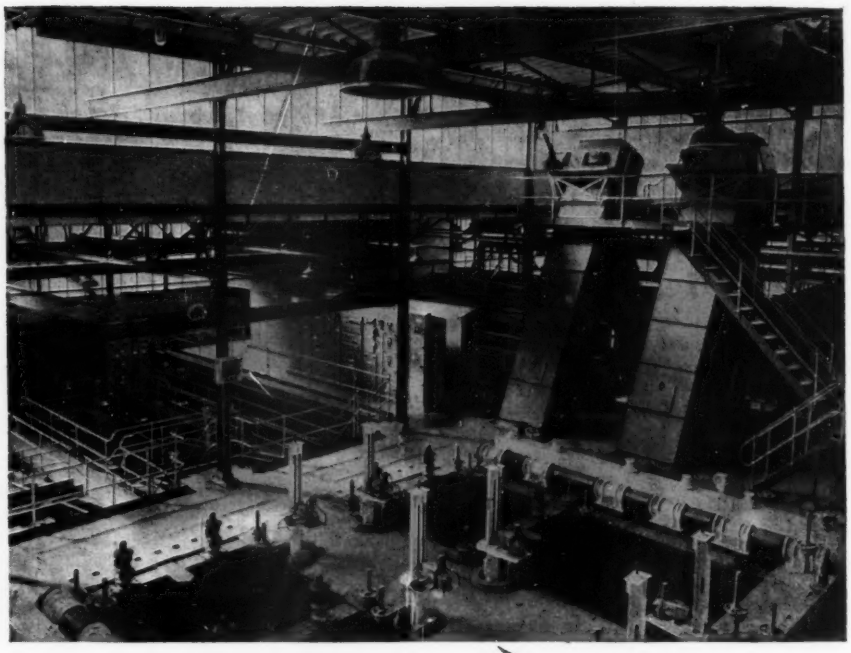
THE BUFFER STOCK RUNS OUT

On June 20, towards the end of a day in which turnover on the L.M.E. reached the record total of 5,150 tons, the International Tin Council announced that the buffer stock manager had withdrawn as a seller of cash tin at the ceiling price in the Agreement of £880 per ton, as the stocks of tin at his disposal were exhausted (see also page 737).

The surprising thing about this otherwise predictable situation is that it has arisen sooner than was generally expected. For some time it has been consistently, but perhaps conservatively, estimated that production might fall short of consumption by at least 15,000 tons. Failing any recession in consumption, the only uncertain factor in the equation was how long the buffer stock would last once the price reached the level at which the manager was obliged to sell.

In our issue of June 2, p. 619, we suggested that the 15,000-16,000 tons which the buffer stock manager and the Canadian and U.S. governments between them could make available to the market more or less immediately might perhaps bridge the gap till next February, after which, unless the U.S. strategic stockpile became available, it was extremely doubtful whether the I.T.C. would be able to keep the situation under control. So far, there has been no confirmation from Washington of the U.S. government's readiness to augment the buffer stock with its 4,000 tons of non-strategic stocks, while the Canadian stockpile of 3,000 tons is to be sold over a period of 10 months. In the absence of these reinforcements there was an obvious danger that the buffer stock might be eroded by a wave of speculative stocking, such as has just occurred. The scramble for cash tin appears to have been triggered off by persistent rumours that a rise in the ceiling price was under consideration, rather than by any actual shortage of metal. Within a fortnight the Buffer Stock Manager is believed to have sold about 9,000 tons of tin, a quantity equivalent to some 5 per cent of annual world consumption.

The top floor of the new 500 t.p.h. Baum plant built for the National Coal Board at Killoch Colliery. Photograph by kind permission of National Coal Board.



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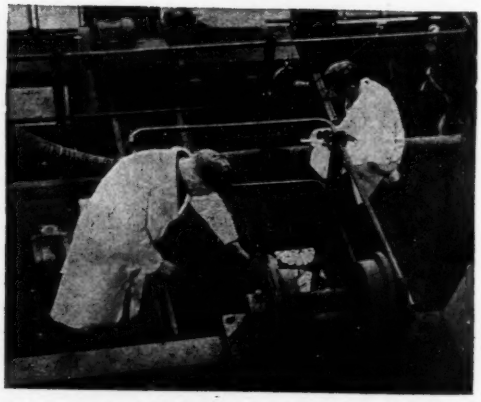

Taking a sample of the dense medium in the Simon-Carves dense medium pilot plant.

The success of the current modernisation policy demands that installations serving the new high-output mine shall be of the highest technical, mechanical and structural quality. This is particularly true of the coal preparation plant, for breakdown or inefficiency there cannot be tolerated if outputs are to be maintained. In the Simon-Carves research and development plant a large staff of scientists and engineers is constantly proving new developments in coal preparation technique. Only facilities such as these, backed by fifty years experience of the business, can provide the vital mastery of the art of coal preparation so necessary to modern mining economy. Facilities like these mean plants like this.

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It was in September, 1958, that the I.T.C. ran out of funds to support the market at the floor price of £730 per ton. The price then plummeted by around £100 a ton, but the downward movement was reversed and tin has never since looked back. This week the ceiling has been pierced and with the disappearance of the buffer stock the Council is no longer in a position to control the upward movement.

Now that the stabilizer has ceased to exist, just how high will prices surge? Fortunately there are several factors which could have the effect of restraining that runaway market which is in nobody's interest. First there is the weight of recent buying, which suggests that many consumers are now holding more than adequate stocks, so far as their immediate needs are concerned. Some of this metal might well find its way back to the market when the price is high enough to bring it out. Secondly, a level will eventually be reached which permits the economic working of what is at present sub-marginal ground. Thirdly, there remains in the background the U.S. strategic stockpile, believed to hold about 300,000 tons of tin, the release of which is conditional on a long series of legal formalities.

So far, the U.S. government has made no move to set this machinery in motion, but it is probable that in time the combined pressure of the I.T.C. and American tin consumers will induce the Administration to make some sales from the strategic stockpile.

With the I.T.C. powerless to determine what the ceiling price for tin shall be, the decision now rests in effect with the U.S. Administration and with Congress who between them must decide the price level above which they are prepared to release American stockpiled tin. Essentially this is a political decision and one in which Bolivia's voice may well proved to be influential in the present state of Washington's relations with Latin American countries.

The crucial question of the moment is whether the necessary legislation is likely to get through Congress before the recess. If no legislation is passed till January, it may mean waiting till June of next year for metal from the stategic stockpile.

Some Organizational and Human Problems Facing Mining

At the annual general meeting of the Institution of Mining and Metallurgy, held in London on Thursday of last week, Mr. A. R. O. Williams took office as President. Mr. Williams began his presidential address by examining some of the many notable changes which have taken place in the techniques of the mining industry over the past thirty years. He then went on to make a penetrating analysis of some of the organizational and human problems facing the industry. Extended extracts from this portion of his address which was *ex tempore*, are reproduced here

GLANCING back over the years one of the developments which is quite striking, is the growth of the big mining company—sometimes called the mining group—not only in South Africa but in other parts of the world. It has obvious advantages. Financing new ventures is easier while the pooling of experience between one mine and another is, in some ways, of assistance to the staff and gives better opportunities for promotion. But, there is a reverse side to this picture.

Some Consequences of the Group System

The first point is, I think, the danger of too much paper; too many returns being required; too much of field management's time being taken up in supplying head office with returns that they feel, perhaps rightly, are of little value. Furthermore, there is also a danger, which some groups are very aware of and try to avoid, of undermining the responsibilities of the field management. In these days of rapid communication, rapid travel, things have only to go a little wrong, or the manager has an idea that he would like to do so and so, and before you can say "Jack Robinson" there is a flood of experts up from head office. Some managers welcome this. They sit back and say "Oh well, I can always call in the experts. They are there; that is what they are there for". Others, of a more independent frame of mind, suffer from a sense of grievance.

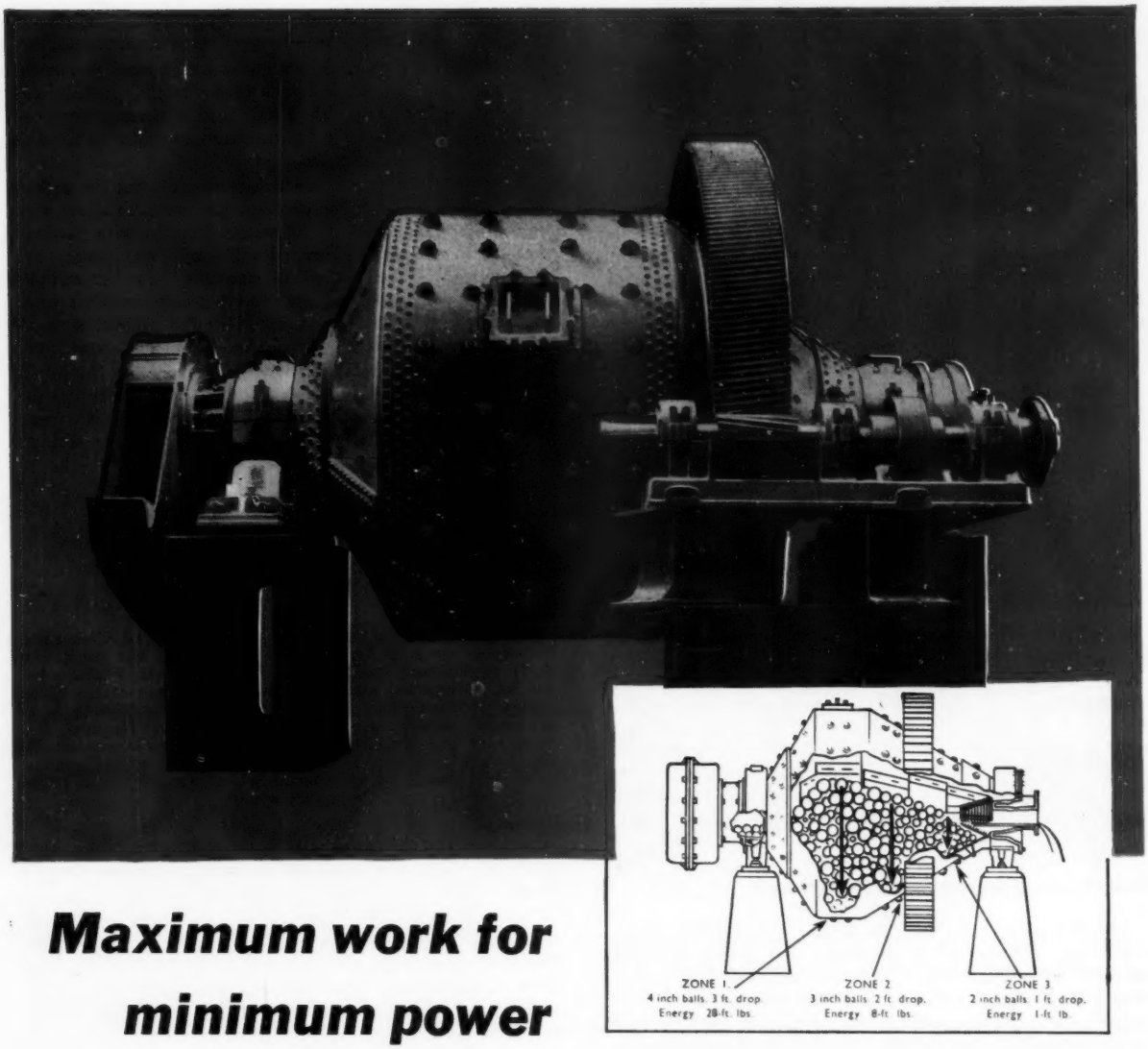
The group system is good in many ways, but it wants very careful organization and an attitude of mind at the top which does not call for too much, or too many, returns and leaves to the field managers a pretty free hand.

Another disadvantage, if one may call it so, of the group system is the neglect of small deposits. Again and again one hears cases of owners of small prospects, mines that are quite good but will never be big, bringing them to the notice of one or other of the big groups and having them rejected, not because the deposits are likely to be failures but because, to the big group, the small mine is as much trouble to run and to look after as something ten times the size producing ten or twenty times the profit. Thus it is not surprising that the big group does tend to reject these. Yet, once a property has, in fact, been turned down by one of the big mining companies, it is virtually impossible for the owners to interest finance from other quarters. I do not know the answer to this but it is, I think, a fact.

A consequence of the group system is the virtual extinction of that vigorous, useful race of men—the independent consulting engineers. There are few left today, and there again, the owner who has had his property rejected finds it difficult to get an engineer outside the big groups to advise him.

Mining Engineers Immobilized by Pension Rights

Another feature of our times is the growth of the big mine, chiefly due to the richer ones being worked out and operations being conducted on a far bigger scale in order to make a profit out of low grade material. Now, this, I think, raises a personal problem for many mining engineers. On a big mine they are apt to stay within one department. There is very little chance in many big operations for an engineers to, so to speak, peep over the wall to see what the other man is doing. In other words, he gains his experience on a rather narrow front. To move to other mines or other fields would be the natural thought on the part of the engineer, but a feature of today is the restriction imposed upon his movements by fear of losing pension rights. Now, this is a point which I think that companies should seriously consider. The value of a mining engineer and a geologist, or of a metallurgist or a mineral dresser for that matter, is greatly enhanced if he is widely experienced—widely in the sense of moving from one type of post or plant to another. A fellow, when he is young, does not worry much, whatever his pension is. He does not think of the future. But take your more valuable man, in his early middle age, who wishes to gain



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further experience—to him his pension rights may loom quite large.

A pension in the past was granted to a man as a reward for long and faithful service. The object, of course, was to retain the employee with the company, but, in the case of men working in our own industry, I do not think it is necessarily to the advantage of the company and it is certainly not to the advantage of the men. I think, therefore, that the companies should consider the possibility of regarding the pension as part of basic pay; as something they have to pay in order to attract the man.

If the man leaves of his own volition to go elsewhere, which is quite normal and natural, the amount of pension that he has earned should, I suggest, be frozen for him to draw in due course when he reaches the appropriate age. I do not think that he should have to suffer the disadvantage of losing those rights should he wish to enlarge his experience elsewhere.

Too Much Secrecy About Costs

In these days of large mines and the enormous capital cost which is involved in starting them up, the consulting engineer or estimator has a very grave responsibility in attempting to forecast the possible working profit and particularly the working costs. If there is no working profit it is obvious that there is no point in going ahead. Now, in a relatively rich mine where costs are equivalent to about 40 per cent of the assumed revenue, an error in estimating costs of only 5 per cent affects profits by a mere 3 per cent, but for a low grade mine where your working costs amount to perhaps 90 per cent of the revenue an error of 5 per cent in estimating these costs would affect your profit by something like 55 per cent. Now, the best check that any engineer can have on his estimates of working costs is a comparison with actual operations of a similar nature. In other words, he will seek the costs data of other mines and that is where he comes up against a very big difficulty.

With some notable exceptions, mining companies publish extraordinarily little about unit costs. What I do suggest to these companies, which after all are not engaged —except in very rare cases—in a competitive business, is that they should publish freely information on working costs or unit costs. Furthermore, I think that those who write technical papers could themselves give more costs data, and possibly the Council might consider whether the Institution itself could not do a service to its members by keeping a central file of all costs data.

A Word to the Mining Schools

Lastly, it is obvious, looking over mining and metallurgy today, that the trained engineer is required more and more. The so-called practical man, the fellow brought up in the hard school (he knows everything! you cannot tell him anything!) is, in a modern mine or plant, nothing less than a menace. There is, therefore, as I see it, an increasingly good opportunity for those who graduate from our mining schools.

The point that has been raised on more than one occasion about mining schools is whether, in view of the technical developments that have taken place in recent years, the course should not be extended. I have not the slightest hesitation in expressing the opinion that it should not. It is, in fact, these changes in techniques that would render, and do render, the practical operating details that might be taught in the school in a longer course, out of date by the time the graduate reaches a position of responsibility. What I would ask of the schools are two things. The first is the elimination of this barrier, of this difference, between metal and coal mining. I have already referred to various techniques and equipment which have been borrowed from the coal mining industry. We ourselves can perhaps claim to have given to coal mining what they term horizon mining, which made a great stir in the coalfields a few years ago but had been practised by our metal mining predecessors for centuries. I see no difference between mining black stuff or yellow stuff. I think that we have much to learn from the coal mining industry but venture to suggest that we can perhaps help them on occasions.

Now, the other, perhaps revolutionary thought is this. I would like to see added to the curriculum of the school of mines some teaching on history. That may sound strange, but today, particularly in Africa, where conditions are changing with the rise of nationalism, it is, I think, desirable that the young student or young graduate should have some better knowledge of the background of the countries out there than he can gather from the Popular Press. I think that the mining schools could do much to keep their students informed of the background of the countries to which those students may eventually go.

ANOTHER CORNISH LAND DISPUTE

Land at Roskear Fields, Camborne, Cornwall, has been the subject of yet another enquiry by the Ministry of Housing and Local Government. The last occasion was when planning permission was sought to win and work tin ore at Carnelloe (See *The Mining Journal*, May 19, p. 561), and scenic amenities were alleged to be threatened. This time the dispute was whether the land at Roskear Fields should be reserved for the needs of South Crofty Mine or become the site for a housing estate.

Mr. V. Cory, who had entered an appeal on the failure of the Cornwall County Council to give notice within the statutory period of its decision on the application for permission to build houses on the site, said it was unreasonable to object to the proposal as the land in question was enclosed by residential development, and there was no prospect of connecting the mine headquarters with the land. Rail connection would be impracticable, road transport uneconomical. Near-by house owners would probably object to stamps or crushing plant.

Mr. J. D. Murray, assistant county solicitor said the holding, though far from ideal, would be described as suitable for houses, but the planning authority had no hesitation in deciding that the prior claim was that of the mineral owners. In 1952 planning permission was granted to South Crofty for getting minerals from the land which had been scheduled in the town map for underground mining. South Crofty was one of the only two tin mines now at work in Cornwall, and the area in question was of supreme importance as the management had very strong grounds for thinking there was a high mineral content.

Mr. N. K. Kitto, manager of South Crofty, said that if mining was to continue to extend westward still further shaft facilities west of Roskear shaft would be an absolute necessity. The position of a shaft had to be governed by that of the orebodies and other geological considerations rather than by surface planning. For that reason the company could not consent to any further reduction of its planning rights in Roskear Fields area. With 390 workers, South Crofty was one of the principal sources of employment and one of the largest rate-payers in Camborne-Redruth.

Commonwealth Conference—IV

RECENT ADVANCES IN MINE SAMPLING AND UNDERGROUND

A COMPARISON between the work of Native chippers and their European supervisors reveals that as the Native took the original samples and the European the associated duplicates, charts indicated that, on average, the Native chipper returned lower sample values, resulting *inter alia* in a higher Mine Call Factor. This phenomenon, corroborated by many more comparisons than are given here, confirms the authors' earlier theory that a well-trained and well-supervised Native chipper should produce more reliable sampling results than obtained hitherto. It was felt that, in certain cases the European sampler, who knew precisely how to sample but failed conscientiously to do so, would nevertheless ensure that the procedures were properly carried out by his Native helper. Moreover, as the Native never sees the results of his chippings, he can only sample mechanically.

Samplers' work can be affected by assay discrepancies. A routine sampling control chart should be kept, because it shows ratios both before and after the re-assaying of such initial ratios as gave rise to out-of-control points.

Incidentally, although it had long been known that the lower grade assay prills contained more silver than the higher grade beads, a uniform discount for silver (usually 10 per cent) was standard practice. As the winning of the lowest grades of ore was less important than it is today, it was not then fully appreciated that what appeared to be marginal-value stopes were, in fact, unpayable workings. Differential silver discounts, advocated by J. B. Aldum[9] in 1947, were first applied by Rand Mines, Limited[7], in 1956 and are now commonly used.

It is interesting to note that on one mine, with a single narrow reef, it was standard practice to take a check-sample at every section sampled. The original and check-values were averaged for valuation purposes. The control chart was not then in use, but empirical limits of variability had been in vogue for some years. These limits were narrower than those determined later by the writers and, consequently, many pairs of values were being unnecessarily re-assayed or re-sampled—a waste of both time and money. Such empirical limits were, in fact, unrealistic in that the samplers were thereby challenged to produce more consistent pairs of samples than nature itself would permit.

Value Contour Plans

A common pre-war practice was to plot the position and in. dwt. value of each point sampled in the stopes; and then to sketch in contour lines, at selected intervals enclosing similar values, in an endeavour to trace any pronounced directional trend of value. Mention is made of them here only because they have been re-introduced on a limited scale by two groups in recent years, and it is claimed that they serve a useful purpose. More especially in the newer goldfields, these plans, provided they are extended by an unbiassed person, constitute an increasingly significant visual guide to the distribution of values.

Substantial profits have been made on older mines by the selective mining of rich "pay-shoots" that were not disclosed by the original development.

The application of statistical techniques to a similar type of problem has been undertaken by F. W. J. Ross, of the General Mining and Finance Corporation, Limited, who had noted that there could be several lognormal distributions in one mine. The overall distribution was not lognormal but he was able, from bi-modal appearances, to separate the different areas into fairly homogeneous log-normal "populations".

To find the more favourable zone for almost immediate exploration on another mine in that group, Ross examined the log-variances of sampling values traversed by lines drawn across the mine workings at various random angles. For each line, the variance was calculated from the relevant distribution of values, and the line of minimum variance gave the best indication of where the (more homogeneous) richer values or "pay-shoots" probably lay. His advice to proceed from a poor zone in one direction, rather than in another, has so far proved correct.

Determination of Tonnages Mined

It has long been assumed that, apart from a comparatively small tonnage of waste rock trammed deliberately or inadvertently as ore to be milled, the excess tonnage must consist of valueless waste rock (or extraeous reef) that has "scaled" off the hangingwall or footwall of the stopes.

Unmeasured or untallied sources of tonnage hoisted are suspected to be of the order of 3 per cent, a figure appreciably smaller than the average percentage shortfall throughout the industry. Ignoring inherent discrepancies due to the different closing dates of the measuring-tramming month and the milling month, all the relevant factors used in assessing the tonnage delivered to the crusher-stations have been re-examined.

Specific gravities of the various component strata have been re-checked, together with the proportionate weightings assigned to each stratum, and the new "cu. ft. per ton" factors either noted or incorporated in the calculations.

Bias in Stope Measuring

The determination of the "fathomage" broken by the miners has been carefully reviewed. An extensive investigation by Rand Mines Ltd., for example, into the measurement of nearly 600,000 sq. fathoms, disclosed an over-measuring bias and also a bias towards over-planimetering of the irregularly-shaped areas plotted from the measurements made underground. The measuring bias is due largely to taking measurements incorrectly from the main (metallic-cloth) tape while it is sagging. Extra personnel,

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and

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...AL JATION PRACTICE IN SOUTH AFRICAN GOLD FIELDS – II

to lift the sagging tape vertically on to the hangingwall and support it there at reasonably close intervals while the necessary measurements are taken, are not often readily available.

The over-planimetering bias arises from a human desire on the part of the surveyor not to deprive the contractor of fractions of fathomages, and it was found that many surveyors recorded each of the miners' fathomages to the whole number above the actual planimeter reading—a non-compensating or cumulative error.

As is generally the case, the mere highlighting of these practices has served to bring about improvement, and the bias observed from this investigation—average over-measuring 1¼ per cent and over-planimetering 1 per cent, totalling 2¼ per cent—has already been reduced to possibly 1¼ per cent.

As anticipated prior to this investigation, it was found that the over-measuring cum over-planimetering bias very nearly counter-balanced the effect of discarding the convenient 12 cu. ft. per ton in favour of more accurate tonnage factors. Consequently, apart from the knowledge so gained, little progress had been achieved in classifying the major portion of the shortfall in tonnage. The investigation served to confirm that the measurements of area broken monthly are acceptably accurate, and attention was then re-directed towards a more scientific examination of the stoping widths used to compute tonnage measured.

The article appearing herewith is condensed from a paper presented at The Seventh Commonwealth Mining and Metallurgical Congress convened in Southern Africa. It is one of a series in which papers of particular interest are offered in abridged form

Measurement of Stoping Widths

It is well known that in these gold fields the width of the underground excavations at depth gradually decreases with the passage of time until, in numerous instances, the hangingwall is resting on the footwall.

A stope face advance to 10 to 12 ft. per month is still quite a normal average, even in some of the newer mines. Consequently, the sampler necessarily takes his "5 ft. out widths" after the hangingwall has been sagging for about a fortnight. Furthermore, it was known that the footwall, under pressure conditions, tended also to rise into the excavation, so that allowances should be made not for "sag" but for "closure" in stopes. A few years ago, one of the authors (R. St. J. R.) suggested that the rate of closure in stopes was probably more rapid in the week or two following the blasting operations than thereafter; and that, where the "face width" and "5 ft. out width" were almost identical, scaling from hangingwall or footwall, or both, had occurred to a width almost equal to the closure.

An intensive investigation, in collaboration with the South African Council for Scientific and Industrial Research, into the movements of rock strata, has been conducted since 1956 with the primary object of minimizing the severity of pressure bursts, one of the worst hazards of deep-level mining[10]. Although information as to the extent of scaling *per se* is limited, it is now known that closure in stopes—whether simple or in combination with scaling—can range from a fraction of an inch to 9 or 10 in. during the first month after the blast, and that this closure is generally more rapid in the first week or so than thereafter.

So many variables are involved, such as depth of stoping, nature and strength of strata, span of excavated and intact areas, proximity of faults or major and minor dykes, and of neighbouring primary or secondary excavations, that it is still virtually impossible to assign a scientifically acceptable rate-of-closure correction to each individual stope width. Attempts to solve all such possible combinations and permutations would be inordinately time-consuming and costly. Tests are therefore undertaken in stopes where conditions are as generally representative as possible with a view to obtaining a reliable average correction to stoping widths for a mine, or a particular portion thereof. Simple measurements have been made between the ends of pairs of borers drilled at various angles into the hanging- and footwall on many mines in the past few years.

Such observations by Gold Fields of South Africa Ltd., and Rand Mines, Ltd. indicate that an overall upward adjustment of the "5 ft. out" stoping width by 2 to 3 in. would be patently justifiable. Preliminary results from scientifically controlled experiments being conducted by Rand Mines, Ltd. in the Orange Free State field[11], indicated a correction of 3 in. which has since been added to each measured width on that particular mine. Such an adjustment to an average stope width of (say) 50 in., increases the surveyors' "broken tons" by 6 per cent—a major step towards reducing the shortfall.

To what extent further research is warranted, is debatable. More and more mining engineers are convinced that there is, for each mine, a small but relatively constant percentage of the tonnage milled that is well-nigh impossible to measure and hence must be accepted as an operational factor or yardstick. It is not yet possible to do more than hazard a guess that this tonnage would be seldom less than 3 per cent of the total tonnage hoisted.

Mine Call Factor (M.C.F.)

Despite its many ramifications, the M.C.F. is almost universally accepted as the only real yardstick or criterion of the overall efficiency of both mining and mine valuation, and rightly so. For various reasons such as the time-lag between the "measuring" and the "milling" month, the monthly fluctuations of the M.C.F. (in dotted lines on Fig. 2 overleaf) are not accorded undue attention.

If, however, the M.C.Fs. are averaged over three months and plotted, the fluctuations are damped down and the trend of such "quarterly" factors merits due attention. It will be agreed that the average over six months gives a fairly reliable indication, and the average over 12 months an acceptably accurate assessment of the quality of the mining and valuation during those periods. Such averages do not, however, show the general trend in a practical manner.

(Continued overleaf)

DESIGN AND FABRICATION FOR HEAVY INDUSTRY

Well over half a century of experience in the design and construction of mining plant and buildings, coupled with the ability to design and fabricate specialist equipment – such as rotary dryers, grinding, classifying and pelletising equipment – enables Head Wrightson Stockton to offer an extensive service to the mining, chemical and iron and steel industries throughout the world.

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To overcome this, at least one mining group is using what is called the "twelve-months' moving average". Each point circled on Fig. 2 represents the average of the six monthly M.C.F.s immediately preceding it, together with the six immediately following it. As each new monthly result becomes available, it is combined with the preceding 11 months' results, and the new value plotted midway along the relevant period on the graph. Consequently, the twelve-months' moving average must always appear on the graph 6 months behind the last monthly result shown, otherwise such points would neither constitute nor represent the correct trend about which the monthly fluctuations play.

Fig. 2 is an interesting example of the progress achieved in mine valuation by mining engineers in recent years. This especially illustrative example refers to a mine of the Rand Mines Group, and shows the results achieved since April 1953. Special investigations and attempts to effect improvement were started in the first half of 1954. This period on the diagram, shows that—after a particularly bad spell—the M.C.F.s steadied up on a plateau showing an unsatisfactory factor of about 72 per cent. Since then, as weaknesses were highlighted and gradually corrected, the fairly steady and continuous improvement of the M.C.F. can only be regarded as satisfactory. As can be seen, it is now of the order of 90 per cent. Bearing in mind that losses of gold, both underground and on surface, are inevitable despite all precautions taken, it appears to the authors that a "twelve-months' moving average" M.C.F. in excess of 93-95 per cent can neither be expected nor accepted without question. That such gold losses occur is amply proved by the substantial quantities recovered during the clean-up of dismantled reduction plant, and during the prevalent small-scale re-mining of underground workings abandoned in bygone years.

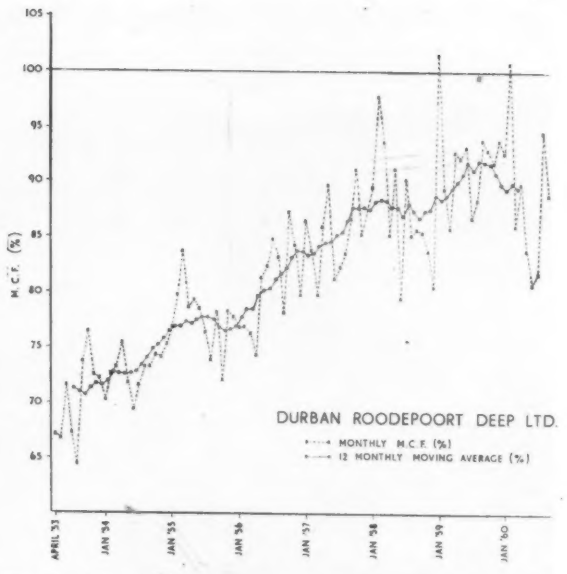

Fig. 2. Monthly and 12-monthly moving average Mine Call Factors at Durban Roodepoort Deep Ltd.

(References appeared in last week's issue)

CANADIAN COLUMBIUM CONCENTRATOR TO START SOON

ALTHOUGH large reserves of the columbium mineral pyrochlore were discovered in Canada during the extensive search for uranium, difficult extractive and process metallurgy problems have hampered development of these resources.

One of these columbium-tantalum-rare earth deposits was discovered in 1953 by the Molybdenum Corporation of America at Oka District, Two Mountains Country, about thirty miles north-west of Montreal. Since then a considerable amount of exploration work has outlined large columbium bearing areas associated with tantalum, rare earths, radio-active elements and magnetite-ilmenite minerals. The ore minerals have been identified as pyrochlore, perovskite, betafite, britholite, magnetite and ilmenite, and, in addition a new mineral species called niocalite, a calcium columbium silicate, has been found in significant quantities. Niocalite contains 19 per cent columbium pentoxide.

The latest report from St. Lawrence Columbium and Metals Corporation, which has concessions at Oka, sounds particularly promising. The company states that there are some 62,000,000 tons of indicated and proved pyrochlore ore on its property, containing some 500,000,000 lb. of columbium pentoxide. This, it appears, occurs on just the explored part of the company's property and includes only ore containing as a computed average a minimum of eight pounds of Cb_2O_5 per ton. Proved ore included in the foregoing figures amounts to 17,600,000 tons located on Block "A" of the property where stripping of the overburden has been completed and where an open-pit method of operation is planned to start.

Furthermore, the company states that the building for a commercial concentrator has been completed, and all major equipment is now on its way to the plant or, at any rate, has been ordered. An independent crushing unit under construction, will have a daily capacity of 500 tons of ore or an annual capacity of 1,400,000 lb. of Cb_2O_5.

The commercial plant is expected to start operations in August this year.

St. Lawrence Columbium and Metals Corporation has exclusive rights to a concentration process confirmed by one year of production in a pilot plant, erected at Montreal, which was designed by The Galiger Company of Salt Lake City. (See *The Mining Journal*, Jan. 27, 1961 p. 99.) This plant has worked about 1,000 tons of ore since its erection. The Galigher designed process involves gravity separation and direct selective flotation of pyrochlore. It recovers 80 per cent of the columbium and grades the concentrates to oxide content of 50 per cent and upwards. Low grade columbium bearing minerals like perovskite, with a high titanium content, are eliminated.

St. Lawrence believes itself to be in a competitive position: in the first place reserves are adequate—the mine life is indicated at 100 years—secondly, mining operations will be on a low cost open-pit basis, and an efficient beneficiation process will be employed.

Demand for columbium has grown with the development of turbo-jets, rockets and nuclear energy, and more recently space vehicles. It is understood that South American Minerals and Merchandising, New York, has been appointed exclusive sales agent for St. Lawrence output. This firm is one of the group controlled by Dr. Mauricio Hochschild, the tin and tungsten authority, formerly of Bolivia.

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The International Construction Equipment Exhibition

Providing the most comprehensive display ever assembled of construction equipment for the world's building and civil engineering industries, the exhibition at the Crystal Palace from June 15-24 has been the first major exhibition to be held at that venue for 25 years. Exhibits included many items of interest to the mining industry. The exhibition was jointly sponsored by The Federation of Manufacturers of Construction Equipment, The National Federation of Building Trades Employers, and The Federation of Civil Engineering Contractors.

The exhibition was opened on Tuesday last week by the Rt. Hon. Reginald Maudling, President of the Board of Trade.

Many new models and several new designs pointed towards both the completion of existing equipment ranges and to general improvements with regard to flexibility and mobility. The advanced design of much of the equipment shown, together with the high overall standard of construction, spoke well for the equipment manufacturers and should lead to expansion in the already well-established markets overseas. It is perhaps to be questioned whether the exhibition could not officially have recognized opencast mining and quarrying, as so much of the equipment displayed is applicable to the conditions prevailing in these industries.

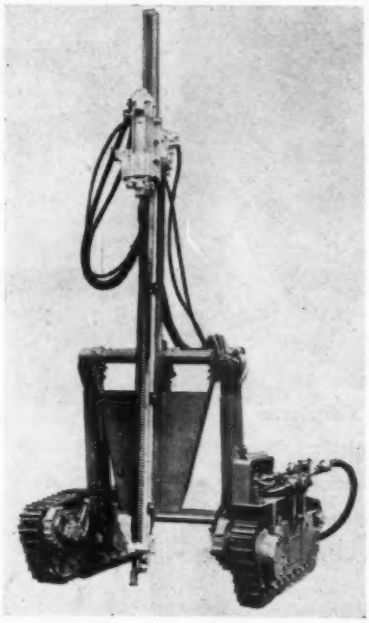
International Harvester Company of Great Britain exhibited the widest range of their construction equipment ever shown in this country. Besides twenty-one exhibits manufactured by IH in Great Britain—four of which were on show for the first time—there were ten from the International Harvester Co. of Chicago never before seen in this country, together with one new crawler tractor and equipment from Canada.

New machines from IH Great Britain were the Boughton model PL-20H sideboom, 71,500 lb. max. lift capacity; the 35 k.VA, 23 k.VA alternator attachments for B-450 and B-275 wheel tractors, and the 1¼ cu. yd. B-8K-3 International Drott skid-snovel for BTD-8 (80 series) tractors. International Harvester have recently entered the power unit market in Great Britain with two new power units, the BUD-144 and BUD-264.

International's 19 ton, 250 h.p. 652 Payhauler

The 19 ton 652 Payhauler end dump wagon was exhibited in the demonstration area of the showground.

Also exhibited were International Hough payloaders, 3 new 4 wheel-drive models, the 4¼ cu. yd. H-120 Payloader, other like equipments and crawler tractors.



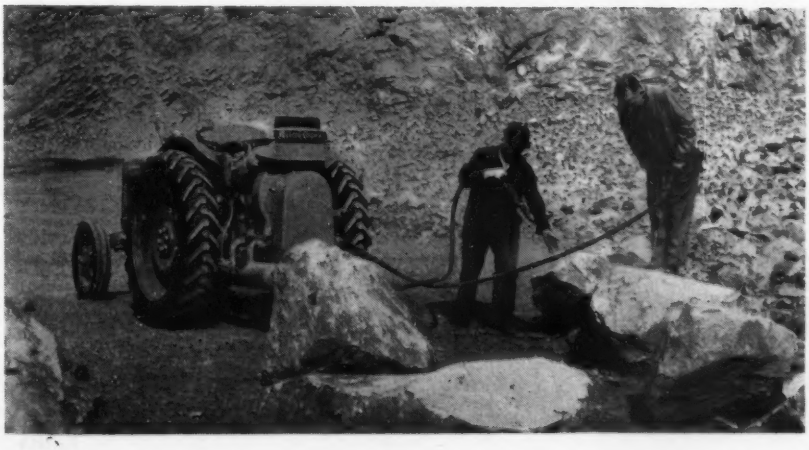
Above, in centre of page, the Joy TDM Trac drill

Below, the Atlas Copco Roughrider 140.

Joy-Sullivan Ltd. displayed a selection of products from its range of air compressors and rock drilling equipment. Two of the exhibits had not previously been shown at any exhibition in Britain.

The first was a new rotary vane portable air compressor, the Airvane RP.260, capacity 260 c.f.m. free air delivered at 100 p.s.i. The second new machine was the Joy TDM Trac drill, a self-propelled crawler track-mounted carrier fitted with a 450-DR dual rotation drill of 4½ in. bore, on a carrier designed for moving deep-hole percussion drills over the roughest terrain. Power-operated in all its movements, its tramming power enables it to tow a 600 c.f.m. portable compressor up to 10 per cent gradient. The 450-DR drill is capable of drilling holes up to 4 in. diameter, 40 ft. deep.

Other machines on the stand included a RP.600 rotary portable compressor, the UW.181 wagon drill mounting an AL.47 rock drill, and a selection of hand-held and air-leg mounted rock drills, including the JAL.47, the type used in a recent contract in South Wales when the N.C.B. tunnelling record was broken.



Atlas Copco (Great Britain) Ltd., showed portable air compressors, rock drills, shovel loaders and stationary air compressors which can be easily mounted on construction sites where a lot of compressed air is needed. Both reciprocating and screw compressors were included in the range of portables on show. For bigger air deliveries, Atlas Copco offered

(Continued overleaf)

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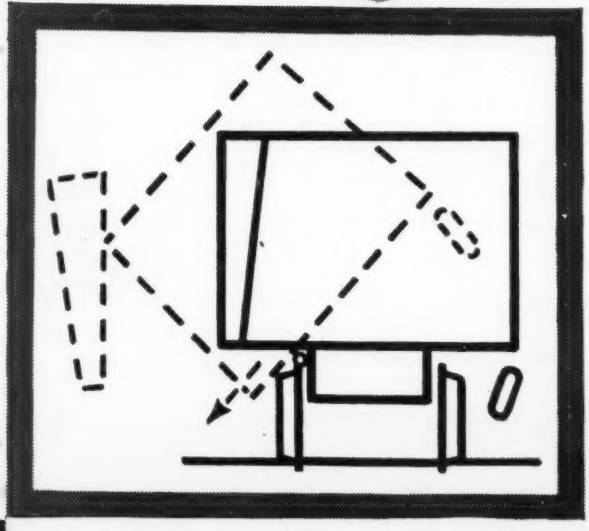

Schematic drawing showing single side discharge 'Granby' Car operating over a ramp at the side of the track. Maximum angle of tip is 50°.

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their two portable screw compressors, the PR365 and the PR600, delivering 365 c.f.m. at 100 p.s.i. and 600 c.f.m. at the same pressure respectively. Shovel loaders and drills were also shown.

A completely new machine was shown by Atlas Copco. Known as the Roughrider, this combined unit is a Fordson Major tractor carrying a 2 cylinder reciprocating compressor of the type used in two existing Atlas Copco machines, the VT4 portable and the TT6 skid-mounted stationary compressors.

Also shown was the new BVB 81 crawler mounted drill, a self propelled unit designed for parallel hole spotting from the straight to the horizontal. Shown for the first time in any exhibition in the U.K. was the 125 NT, one of a new range of tractor-mounted air compressors.

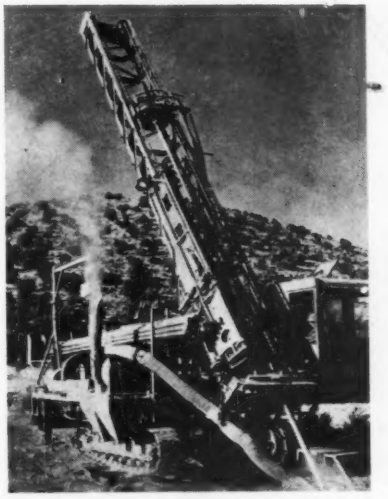
The Consolidated Pneumatic Tool Co. Ltd. showed drilling equipment including models from the Reichdrill range. Other heavy drilling equipment included two Trac drills, one mounting a CP Rotauger and the other a 4½ in. heavy drifter. A wagon mounted drifter was also shown as a CP-55 diamond drill, complete with core barrel and examples of cores. C.P. rock drills for both wet and dry operation as hand held sinkers or feedleg mounted drills were also shown.

A principal exhibit on the *Mackay* stand was the new Morewear "Goose", a tractor-drawn hydraulic tipping dumper with a capacity of 8 to 10 tons, manufactured by R. Smith (Horley) Ltd. Also shown was the Eimco 850 dump truck, the Allis Chalmers HD 6G crawler tractor shovel, BTL 14D rubber tyred tractor shovel, as well as other industrial engines and other equipments.

A new 3 cu. yd. capacity British- built excavator, the 1205, was shown by *NCK-Rapier Ltd.* The NCK-Rapier 1205 is of advanced design and is built in this country under licence from the Koehring Co., U.S.A. NCK-Rapier 1205 face shovels and draglines are now operating on various sites in England.

Ransomes and Rapier Ltd. showed the Rapier 9 cu. yd. hydraulic drive truck mixer mounted on a Foden chassis, the Rapier 1520 mobile crane, and the Rapier 6P80 self priming pump.

The 4-wheel drive Chaseside Loadmaster 1000 loading a Chaseside Hi-Speed dumper. A comprehensive selection from the Loadmaster range was shown



Above, the C.P. Reichdrill. Below, Ruston-Bucyrus Ltd. showed the 30-RB cambered-boom type dragshovel with 3 ft. 6 in. wide hoe dipper. This air-control machine is crawler mounted and powered by Ruston 5YEN engine, 98 h.p. at 1,500 r.p.m.

The three U.K. companies of *The Aveling-Barford Group:* Aveling-Barford Ltd., Barfords of Belton Ltd., and Goodwin Barsby & Co. Ltd., exhibited on a combined stand a comprehensive cross section of their roadmaking, earthmoving and quarrying equipment, similar to that on show at the Public Works Exhibition last November.

Several new machines by *Caterpillar Tractor Co. Ltd.* were shown to the public for the first time at the exhibition. Pride of place went to the D9G tractor and the 619C tractor-scraper. Both machines were having their first public showing at the exhibition.

Thos W. Ward Ltd. showed the Track-Marshall crawler tractor, the Challenger 33 diesel crawler tractor and other equipments.

Ingersoll-Rand Co. Ltd. showed their complete range of portable rotary air compressors, known as the GYRO-FLO, available in 125, 250, 365 and 600 c.f.m. sizes, together with the two-stage, air-cooled, portable Model TP60. A range of hand-held units was also shown.

Holman Brothers Ltd. showed a Rotair 150, smallest of the Holman rotary compressor range, mounted in an Austin 152 Omnivan. Other Rotair models exhibited were a 600 portable, and a stationary, electrically powered version of the Rotair 370. A range of Holman rock drills, road breakers and pneumatic tools was shown, together with a selection of Holbits and Holsteels. A Holman Tractair, a compressor mounted at the rear of a Fordson tractor and driven from the power take-off shaft, was exhibited with a muledozer attachment. Drill-rigs included the crawler mounted Holtrac, a tractor mounted Vole drill and a wagon drill.

Equipments manufactured by subsidiary companies in the Holman Group were also on the stand: from *Maxam Power Ltd.*, a selection of pneumatic control equipment comprising cylinders in various sizes and a range of control valves. From

(Continued overleaf)

If you want to dig ton after ton of overburden, ore-bearing minerals or clay for bricks . . . if you want to go on doing it day after day, year after year . . . then you want one of two things . . . a RapieR Walking Dragline . . . or a RapieR Stripping Shovel.

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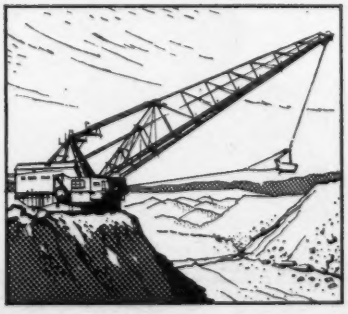

Ransomes & Rapier Limited, Ipswich, England

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Dustuctor Co. Ltd., dust control equipment for use on portable tools, using the low volume, high velocity method. From *Goodyear Pumps Ltd.*, Sales-Service Division, examples of Goodyear Pump sets suitable for site work.

Motor Rail Ltd. displayed for the first time in this country their 28 b.h.p. 3½ ton Simplex locomotive incorporating the new Simtran transmission, for mining, quarrying and general use. Also shown were two heavy-duty dumpers, the MR 375 and MR 450, recently introduced to the public.

Fodens Ltd. showed the Gardner 6LX 6 cylinder developing 150 b.h.p. at 1,700 r.p.m., unit 12 speed epicyclic (double underdrive), double drive, 8¼ in. centres worm gear. The body is of 11/12 cu. yd. capacity. Also shown was the Foden Mk. 111 6 cylinder two stroke developing 150 b.h.p. at 2,400 r.p.m., 12 speed (underdrive), and double reduction rear axle. The body is of 8 cu. yd. capacity.

The principal exhibit by *Pegson Ltd.* was a Wibau W5 coating plant. In all, Pegson exhibited over 40 separate pieces of equipment including a 24 ft. sand classifying tank, being shown for the first time. The remaining heavy equipment on display included a 42 in. by 48 in. single toggle roller bearing jaw crusher (running light), a 36 in. by 6 in. roller bearing granulator, a 36 in. gyrasphere crusher, a 20B gyratory crusher, a 7 ft. super-scrubber and a 10 ft. by 4 ft. double deck vibro king screen.

Robert Hudson Ltd., featured the hydraulically operated 7 cu. yd Leedsall Dumper Trailer, distributed in the U.K. by Blackwood Hodge Ltd. This outfit consists of a Fordson prime mover or similar tractor combined with a Hudson-built rear dumping trailer of exceptional strength. In addition to the stand display, the machine was demonstrated on the proving ground in conjunction with Bray loading shovels and diggers.

A Libu bucket by *Libu Shovel Co. (G.B.) Ltd.*, was on display. The bucket was shown mounted on a Caterpillar 966 Wheelloader.

Euclid (Great Britain) Ltd. the manufacturers, shared a stand with their distributors in the United Kingdom, *John Blackwood Hodge & Co. Ltd.* On the stand was a range of rear dumps from 15 to 27 tons, motorized scrapers 7, 14 and 24 yd. capacity and the C-6 crawler tractor. On the proving ground a Euclid TS-14 twin powered scraper and the Euclid C-6 crawler tractor were at work.

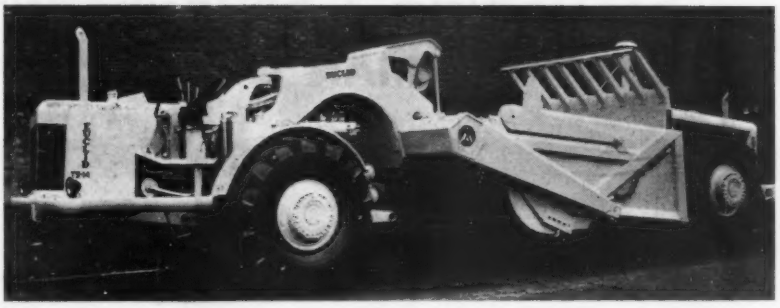
The cost reduction advantages of Euclid twin-powered all wheel drive are incorporated in the TS-14, a British built 280 h.p. 14 cu. yd. capacity scraper. As with the Euclid field-proven 24 yard Twin TS-24, the machine has twin engines—one fore and one aft, driving all four wheels. In both front and rear the drive is through a torqmatic drive giving full power on the go gear shift. All scraper operations— bowl, apron and ejector — are hydraulically and independently controlled.

F. Taylor & Sons (Manchester) Ltd. introduced a new earth boring machine. Manufactured under licence from The Salem Tool Co., U.S., the British-built machine will be known as the Taylor-Salem earth borer and three different models will be produced. These earth borers are compact, readily transportable, diesel-hydraulic machines designed to simultaneously drill a hole and install pipe casing without disturbing the surface.

Two of the Taylor-Jumbo range of diesel hydraulic mobile cranes were exhibited. One, the Series 42, was on stand D8 and the other, the Series 50, in action on the proving ground.

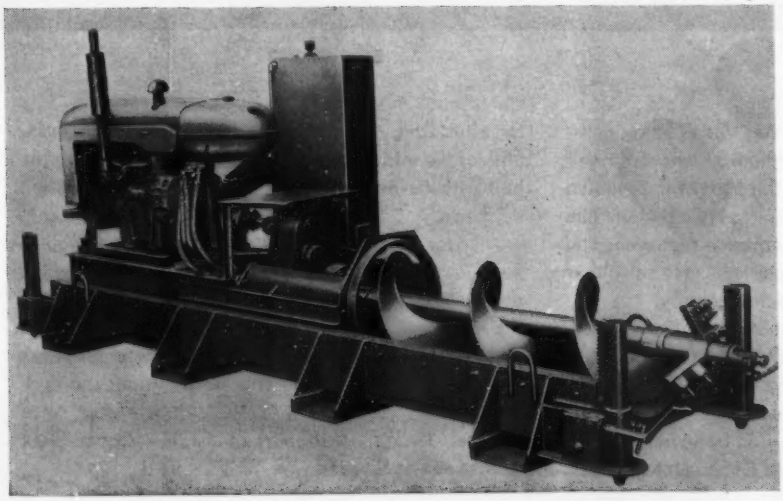
Industrial Pumps Ltd., sole U.K. agents for Flygt displayed BIBO 4, a compact and lightweight pump which follows BIBO 3, introduced to Britain last year. BIBO 4, with 6.5 h.p. against BIBO 3's four h.p. will pump up to 27,000 g.p.h. or up to a 118 ft. head. Like its forerunner, BIBO 4 is a compact single unit, easily portable. Both BIBO 4 and BIBO 3 were on show at the Crystal Palace, and BIBO 3 was seen working on the stand.

The *Shawnee Poole* system of earth-moving haulage was on show and was demonstrated on the proving ground 121. The system is claimed to effect 50 per cent economies in operating costs by harnessing a standard agricultural tractor to an articulated rear-dump hauler, and its gooseneck coupling gives 110 deg. of turn, resulting in a claimed shorter turning circle than any other equipment of this kind.

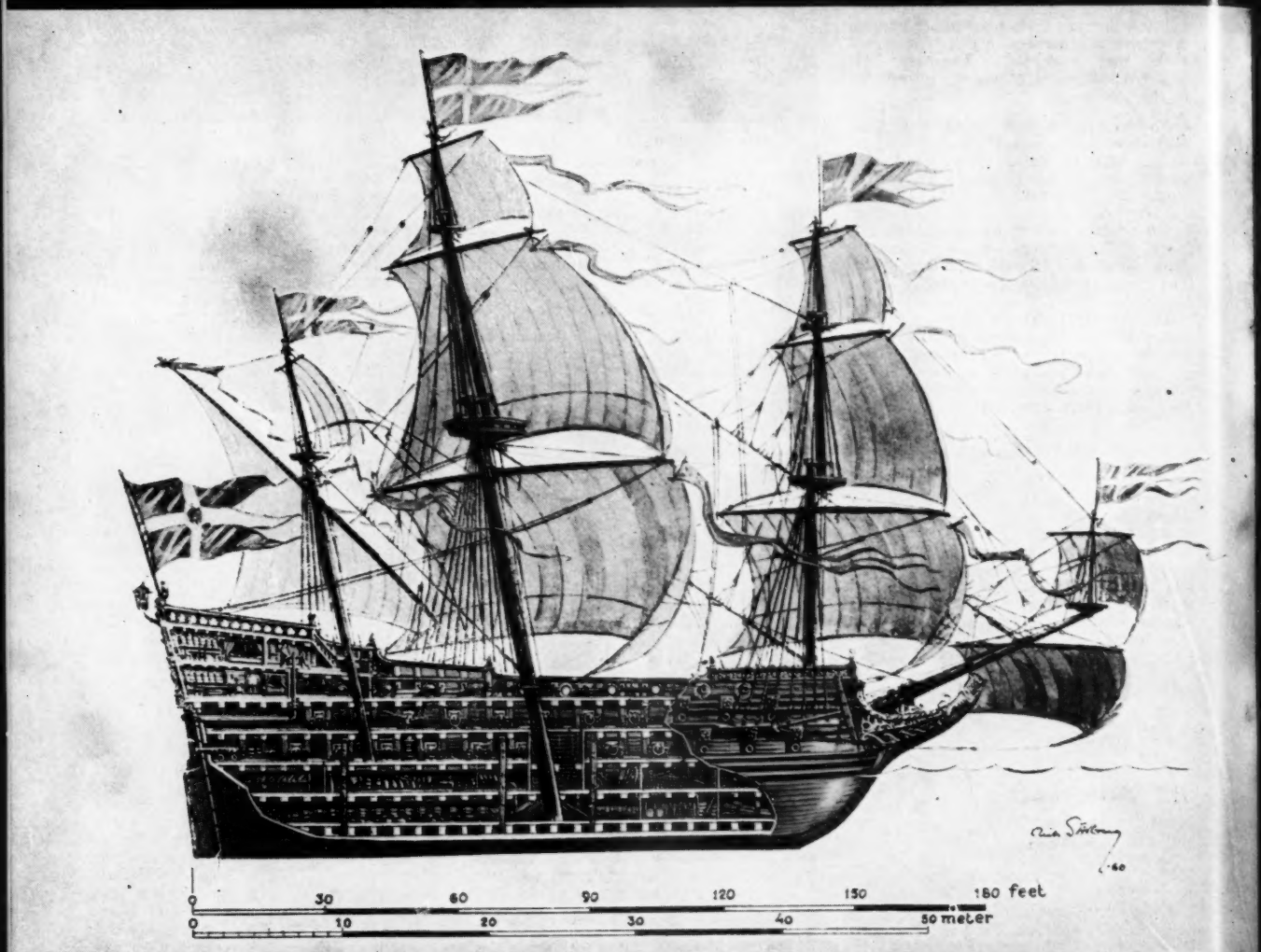


Alongside, at right, the MR 450 heavy duty dumper. Below, at bottom of page, the 24 TD Taylor - Salem borer

Above, at top of page, the TS - 14 Euclid scraper. Alongside, at right, the Foden Gardner 6LX unit



SALVAGING A SEVENTEENTH CENTURY MAN O' WAR



IN 1628 the Swedish Man o' War 'Vasa', newly commissioned flagship of her squadron, capsized and sank in Stockholm harbour at the start of her maiden voyage. Now, more than three centuries later, she has been raised to the surface and marine historians will be able to see at first hand what it was like to sail under the Swedish flag in the seventeenth century.

Compressed air has played an important part in raising the 'Vasa' from her original 17 fathoms. Atlas Copco compressors supplied air to sustain the divers, and to power the air-lift which removed the mud and silt cleared from in and around the ship by powerful water jets. They also powered the Atlas Copco air tools used for shuttering the open gun ports, plugging leaks, and for the intricate underwater work of tightening the hull with tie-bars and strengthening it with wooden supports.

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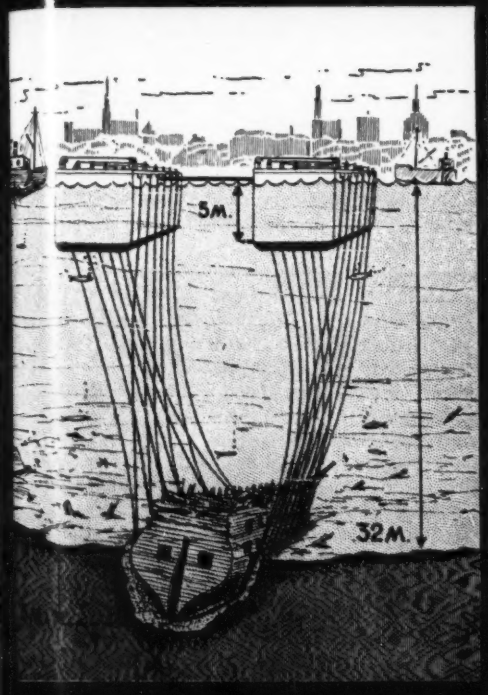

THROUGH THE HEART OF MONT BLANC

On completion of the seven-mile Mont Blanc road tunnel motorists will find Paris 137 miles nearer Turin. For the first time they will be provided with an Alpine link between France and Italy open all the year round. More than half the tunnel is being driven from the Italian side using Atlas Copco rock drills fitted with Sandvik Coromant drill steels and powered by Atlas Copco compressors.

OIL PROSPECTING IN THE SAHARA

In the continuing search for hidden oil resources in the Sahara, seismic prospecting techniques are often employed. Many prospecting companies use Atlas Copco equipment to drill the hundred or more sounding holes for each blasting pattern. Typical of the units used for this work is the Atlas Copco truck-mounted compressor–air cooled for desert operations–driving a chain-fed rock drill with Sandvik Coromant drill steels.

POWER AND IRRIGATION IN THE PHILIPPINES

The Agno River scheme in Central Luzon will increase the regional power supply by 430,000 kW and enable local farmers to cultivate their land in the dry season. The second stage of the project–the 100,000 kW Binga dam–has already been completed. All underground drilling at Binga has been carried out with Atlas Copco rock drills fitted with pneumatic pusher legs and Sandvik Coromant drill steels.

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MINING MISCELLANY

The U.S. Bureau of Mines has awarded a contract to Earl Troup, of Cory, Colo. for controlling a fire that has burned nearly 25 years in a coal deposit on public land near Paonia, Delta County Colo. which should result in considerable coal reserves being saved. In the past, Federal fire-control projects have cost about 1 cent per ton of coal saved. Mr. M. J. Ankeny, director of the Bureau of Mines, states that 227 fires still burn uncontrolled in inactive coal deposits in the U.S., and during the past 11 years, the Bureau has directed 80 successful coal-fire-control projects, saving the country a total of approximately 306,000,000 tons of coal.

★

The Swedish firm ASEA has received an order for mining equipment worth over £1,000,000 from Mt. Isa Mines of Australia, as part of Mt. Isa's plans to expand copper mining capacity, from 2,500,000 tons annually, to 5,000,000 tons by 1964. Among other work, ASEA will erect a 60 m. high pit tower and three multiple-track pit lifts on the Mt. Isa site.

★

Salzgitter of W. Germany has signed a contract with Yugoslav State authorities to investigate the use of medium Fe content iron ore for the production of steel, in connection with new plants in Yugoslavia.

★

The foundation stone has been laid of an aluminium plant to be constructed on a 400 acre private sector site near the Mettur Dam, in Madras State, India. The plant, which will cost 100,000,000 rupees, will have a production capacity of 10,000 tons annually, and is to be built with technical and financial assistance from the Italian firm of Montecatini. Production will commence early in 1963.

★

The Director-General of the Israeli Ministry of Development has disclosed that two foreign copper producing concerns are prepared to invest half of the present value of the Timna Copper Works, and half of the amount required to double output, and are interested in the expansion of the Timna works on a 50-50 basis with the Israel government.

Barclays Bank D.C.O. reports from Southern Rhodesia that preliminary talks have been held regarding the possible development of the Buckwa iron ore deposits and the establishment of pig iron plant. Rhodesia Railways have also received enquiries regarding the possibility of transporting between 20,000 and 500,000 tons of ore annually, mostly from Japanese interests. A new company, Matsuo Rhodesia Mining Co. (Pvt.)—a connection of Matsuo Mining Co. of Tokyo—has been registered in Salisbury, and is understood to have purchased mineral rights covering tantalum and beryllium deposits.

★

A/S Norsk Nefelin, a subsidiary of A/S Christiania Spigerverk has begun exploitation of extensive nepheline syenite deposits at Stjernoya in Finnmark, Northern Norway. Initial plant capacity is 50,000 annual tonnes, which is to be doubled eventually, output going mainly to the U.K. and Europe. It was further announced that another Spigerverk subsidiary, A/S Rodsand Gruber, which supplies ferrous raw materials for smelting by the Spigerverk firm A/S Bremanger Smelteverk, is to increase its annual output of iron concentrate from 103,500 to 150,000 tonnes.

★

The Swedish company, Hoeganaes Billesholm AB, are ceasing mining operations at Olvoen Island, on the Angermanland coast, where vanadium and titanium deposits have been worked for 15 years, as the ore content is too low to enable economic working to be feasible.

★

Experts from the Yugoslavian firm, Geoistrazivanje of Zagreb have been sent to Venezuela to examine bauxite and manganese ore deposits.

★

Two important State coal mines on the west coast of the South Island of New Zealand are to be closed, because Japan has not renewed the contract for this coal. As a result the town of Blackball where the mines are the main source of employment, may suffer considerably.

A new south-western depot, in the Pinhoe Estate, Exeter, was officially opened by C. J. Lake, chairman of Bowmaker (Plant) Ltd. on Tuesday, June 6. The new depot, designed to deal with all types of "Caterpillar" earth-moving equipment, replaces Bowmaker's Fenny Bridges branch, a move which is an important phase in the company's history

I.M.M. Gold Medal

At the Institution of Mining and Metallurgy's Annual Meeting on June 15, presentation of the Institution's Gold Medal for 1960 was made to The Rt. Hon. Lord Baillieu, K.B.E., C.M.G. M.A., Honorary Member, in recognition of his distinguished services to the Commonwealth mining and metallurgical industries. Lord Baillieu made a plea for a spirit of understanding and tolerance in approaching the difficult questions affecting our future and formal relationships with professional bodies in South Africa, which, until recently, had all been part of the Commonwealth. Honorary Membership of the Institution has been conferred on Professor C. W. Dannatt, past president (since deceased). The following awards were also made: The Consolidated Gold Fields of South Africa Gold Medal for the session 1959-60 to Mr. R. N. Pryor; the Consolidated Gold Fields of South Africa premium to Mr. M. L. Fitzgerald; The Arthur Claudet Student's prize to Mr. P. D. R. Maltby, and the William Frecheville student's prize to Mr. A. G. Darnley.

The Bor chemical-metallurgical combine in the east Serbian region of Yugoslavia plans production at an annual rate of 55,000 tonnes of copper in the first stage, and almost 80,000 tonnes when expansion is complete. The plant at present has a total annual capacity of 30,000 tonnes of blister and electrolytic copper. Production at the Bor mines is also to be increased, from 2,200,000 tonnes at present to 3,000,000 tonnes annually, while further investments are planned to raise the gold, silver and selenium output. A rise in production of germanium dioxide, to a total of 10 tonnes annually, is also proposed during the 1961-65 five-year plan.

★

Israel Mining Industries are building a new laboratory in Haifa Bay. It is expected that the company's two-year contract with Baker Perkins for the production of tetra-bromo-ethane (T.B.E.) for ore enrichment will be extended.

★

Polish scientists are reported to have developed a process to obtain metallic uranium from very low-grade ores at a low cost. The process, according to the East German News Agency, *ADN* yields a number of valuable chemical by-products.

★

A big magnesite deposit has been discovered in the neighbourhood of Stalinabad in Northern Tajikistan, reports the *Soviet News*. The deposit, which has been termed the Tajik magnetic anomaly, contains 400,000,000 tonnes of magnetites, according to preliminary estimates. A section containing 50,000,000 tonnes of ore stated to be rich, has already been explored and mapped, and detailed exploration will shortly be completed of another section, with reserves tentatively estimated at over 100,000,000 tonnes.

★

Bauxite ore deposits, estimated at some 200,000,000 tonnes are reported near the Corantyne river, in Western Surinam. The Surinam government hopes to interest Reynolds Metals in a concession. One of the American company s geologists is investigating the site.

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Metals and Minerals

U.S. Barter Programme

An Agriculture Department task force has recommended a sharp step up in the U.S. government's barter programme. which trades surplus domestic farm products for strategic materials. The group, composed of commodity trade officials, exporters and agricultural experts, recommended that the programme be expanded in the following four general areas:

(1) By the addition of many more materials, including cobalt and tungsten, to the list of commodities for which the U.S. is willing to barter.

(2) Instead of bartering for processed metals such as ferromanganese, the U.S. should barter for manganese ore, which would then be processed in the country.

(3) More of the Defence Department's overseas procurement should be paid for with surplus commodities from the Commodity Credit Corporation stockpiles.

(4) International Co-operation Administration procurement, which currently permits foreign countries to buy farm surpluses with foreign currencies, should instead make use of the barter programmes in which the recipient countries could use various metals as payment.

*

An official of the Agricultural Department in Washington has confirmed that negotiations have taken place for the barter of U.S. surplus farm commodities for some 45,000 tons of Canadian lead, and that the contract is expected to be signed in about a week or ten days. Mr. W. S. Kirkpatrick, president of Consolidated Mining and Smelting, the Canadian company concerned, stated on Tuesday that he could not confirm reports that the deal amounted to $10,000,000, since the value was still a matter for negotiation. He added that the company would trade lead for wheat, which would be sold through U.S. brokers. Shipments might cover a period of a year or more, and no increase is anticipated in Cominco's lead production at Trail, B.C.

Negotiations are also under way for a similar agreement involving Australian lead.

INDIAN MANGANESE DIOXIDE FREIGHTS

Last week we reported that India-Pakistan Conferences Secretariat had raised the freight rate on Indian manganese dioxide by 17s. 6d. to 98s. 6d. per 1,000 kilos to main Continental and U.K. ports as from June 1. It has since been cut by 8s. 6d. presumably as a result of the considerable adverse comment which followed the increase.

URANIUM TALKS ADJOURNED

Talks in Canada between a U.K. delegation and Canadian government officials regarding the U.K. commitment to purchase 12,000 tons of Canadian uranium in 1963-66 have been adjourned. A joint statement by Canada's Trade Minister, Mr. Hees, and Sir Roger Makins, leader of the U.K. delegation, said that the adjournment would provide the Canadian and British Governments with an opportunity to give further consideration to the problem in the light of progress made in the talks, which will be resumed at a mutually convenient date. Meanwhile talks on technical matters associated with the commitment are continuing.

NIGERIA PRODUCES REFINED TIN

According to an official report from Lagos, Nigeria produced 101 tons of refined tin metal in April, this being the country's first commercial output of tin metal.

WOLFRAM ORE PRICES

Although conditions are reported in some quarters to have turned a little quieter, a fair turnover has been noted in the wolfram ore shipment market in the past few days. With part of this at higher prices, the range is now indicated at 127s.-132s. 6d. per l.ton unit c.i.f. Europe, compared with 127s.-131s. previously.

LITHIUM'S PROSPECTS

In the annual report to shareholders of Selection Trust Ltd., Mr. Chester Beatty referred to a general increase in the sales of Bikita Minerals in 1960, as compared with the previous year, partly as a result of the successful integration into a single working unit of the original property and the adjacent mine acquired last year from George H. Nolan. Although deliveries under the long-term contract with American Lithium Chemicals were completed early in 1960, there was an increase in the sales of lithium ores to other consumers, particularly in Europe, which more than offset the reduction in deliveries to American Lithium. Since the end of 1960, however, there has been a marked fall in demand from customers in North America, who have been affected by trading difficulties there, and also as a result of stockpiling by various consumers in view of the unsettled conditions in Africa. The statement adds that American Lithium is now producing lithium hydroxide for use in industry from ore stocks already built up, and that application tests of lithium are being carried out by various aluminium companies as a process material in the reduction of bauxite to primary aluminium.

A rising trend in lithium consumption is noted by *American Metal Market* in a recent staff survey. Since the A.E.C. ended its big contracts nearly two years ago, states the journal, producers have been pushing research and development. Perhaps the outlook for lithium compounds is more encouraging than that of the metal itself. More compounds are going into moisture control units of air conditioning equipment, into catalysts for making synthetic rubber, and into lubricating greases. Consumption of lithium hydride in batteries, electronics, polymerization and chemical processing is also picking up. There is some indication that lithium may get back into the rocket propellant scene, and the journal also refers to reports that the Russian orbiting involves the use of lithium fuels. Much development is taking place in lithium-copper alloys, while the use of lithium in welding rods is reported to be improving.

COLUMBIUM AND TANTALUM IN THE U.S.

U.S. domestic production of both columbium and tantalum metal increased sharply dur ng 1960, reports the Bureau of Mines, U.S. Department of the Interior. Columbium production more than doubled during the year, while tantalum production rose to 150 s.tons compared with 122 tons in 1959. The increase in demand for columbium was due principally to the use of this metal in nuclear reactors. Production of ferro-columbium increased by about 43 per cent over 1959, while ferrotantalum-columbium production was slightly lower. Total production of the two alloys was 692 s.tons.

No columbium-tantalum ore was produced domestically in 1960. Imports amounted to 2,526 and 355 s.tons of columbite and tantalite respectively, representing increases of 49 and 9 per cent. The price of columbite (10-1) increased early in the year to $1.18-$1.25 and that of columbite (8½-1) to $1.10 per lb. of contained pentoxides. Tantalites, 60 per cent grade, rose in price from $4.80 per lb. of contained oxide to $7.20, presumably because of unsettled political conditions in the Congo and elsewhere in Africa. Prices of metal generally declined during the year, tantalum ingot closing at $45 and columbium at $35.

As noteworthy technological developments during the year, the Bureau of Mines mentions the coating of columbium with zinc as a deterrent to oxidation, the development of certain columbium-vanadium alloys with highly corrosion-resistant properties, and the further application of ferro-columbium to semi-killed steels to improve their corrosion resistance and tensile strength.

*

Columbium producers are hoping to make good the fall off in demand because of the cutback in nuclear developments by developing high temperature columbium-base alloys for space vehicle equipment. This is the general conclusion of a recent survey made by the *American Metal Market*. Mr. Marx Hirsch, president of Molybdenum Corp. and part-owner of the largest columbium mine in the world in Brazil, is not worried and speaks favourably of the new columbium alloy developments.

Du Pont at its New Metals Centre in Baltimore is likewise optimistic. Recently it started operations with new plant to process columbium for jet engines, missiles and other components requiring strength combined with high temperature performance. One particular columbium alloy contains 10 per cent tungsten, 5 per cent zirconium and has a tensile strength of 40,000 p.s.i. at 2,200 deg. F. Columbium, although priced in the same bracket as beryllium, is much easier and therefore cheaper to fabricate; however, beryllium producers while they, too, may feel the effects of the nuclear cutback, are no less optimistic of finding new markets in the aerospace field.

Besides Du Pont, Fansteel, General Electric, Kawecki, Pratt and Whitney, Texas Instruments, Reduction and Re-

fining, Stauffer Chemical, Temescal, Union Carbide Metals, Wah Chang and Westinghouse are currently engaged in research and development in this particular field for columbium. Some of this work is in the production of high purity columbium with electron beam melting. Bell Telephone Laboratories is investigating the use of columbium alloys for powerful magnets with a potential use in magnetohydrodynamic generators.

EXTRACTION OF NIOBIUM FROM MBEYA PYROCHLORE

The annual report of N.V. Billiton Maatschappij for 1960 makes further reference to the Mbeya Exploration Co. Ltd. and its extensive niobium-bearing deposits near Mbeya in Tanganyika. The extraction of niobium metal from the complex parent ores presents considerable technical difficulties. Following extensive laboratory tests a pilot plant for processing the ores on a semi-technical scale was constructed. However, results so far have not been very satisfactory as the yields continue to be low. Other processes for extracting the metal are now being investigated on a laboratory scale and some promising results have been achieved. It is too early, however, to pronounce judgment on the suitability or otherwise of the relevant processes.

The report adds that niobium consumption, though showing a constant increase over the years, has not reached a level justifying the large-scale exploitation of the company's ore deposits. Full scale working will be necessary to obtain a paying enterprise at the low treatment yields thus far obtained. The concentrates produced by the pilot mill are finding a ready market.

SOVIET AID FOR CUBAN NICKEL

The Russians are to give Cuba technical assistance worth 100,000,000 pesos for mining and processing nickel under an agreement signed in Havana on June 1. The main centre of nickel production will be at the Nicaro mines in the Oriente province.

Soviet technicians will be sent to Cuba to carry out research and survey projects, also trained specialists to initiate and maintain mining processes. Mr. D. Dectiar, head of a special mission from the Soviet Overseas Trade Ministry who signed the agreement for Russia, said that the new plant to be provided would produce 70,000 tons of nickel annually. Cuba's output of nickel for 1961 has been forecast at 10,000 tons worth 2,700,000 pesos and cobalt output at 20,000 tons worth 27,000,000 pesos. Together they account for the bulk of Cuba's mineral production.

It remains to be seen how far the Russians will succeed in their efforts to build up and maintain Cuba's nickel production. So far they do not appear to have met with much success. In particular it is likely to be a long time before production can be resumed at Moa Bay. Nevertheless, political considerations apart, because the Russians are likely to be substantial buyers in the world market for nickel for some years to come, they are certain to be keen and anxious to absorb all the nickel that Cuba can supply for the next decade at least, even in what at present seems the unlikely event of Moa Bay being brought into operation again on a new technical basis.

FERROALLOYS IN JAPAN

Japan's output of ferrochrome in February totalled 4,661 tons, a decline of 881 tons from the previous month's figure, according to the Japan Ferro-Alloy Makers' Association

Total exports of ferro-alloy products during 1960 amounted to 51,181 tons, said the Association. This included 18,196 tons of high-carbon ferro-manganese, 8,967 tons of medium-carbon ferro-manganese, 3,408 tons of low-carbon ferro-manganese, 2,741 tons of metallic manganese, 2,076 tons of silico-manganese, 1,897 tons of high-carbon ferro-chrome, 13,547 tons of low-carbon ferro-chrome, 35 tons of ferro-silicon, 159 tons of ferro-vanadium, 72 tons of metallic silicon, three tons of calcium silicon and 1,977 tons of other products.

The Japanese Ministry of Trade has stated that Japanese chromite imports last year totalled 279,094 tons compared with 260,974 tons in 1959. These totals included chrome ore for ferro-alloy, refractory bricks, and chemical production. The Ministry said that of last year's total, about 30,000 tons of the imports from the Philippines were used for the production of refractory bricks, and nearly 10,000 tons for chemical production, the rest was consumed in ferro-alloy production.

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(From Our London Metal Exchange Correspondent)

The week has again been dominated by the tin market, where large sales towards the end of last week and on Monday gave rise to the belief that the buffer stock was nearing exhaustion. The final ton was actually sold during the second ring of the afternoon market of Tuesday, June 20, by which time the turnover of tin for the day had almost reached the 5,000 ton mark. Other markets, after developing a weaker undertone at the end of the week, turned firmer with the exception of zinc, which still has few friends.

BUFFER STOCK RUNS DRY

As reported last week, the financial aspect of the tin contango led to large purchases of cash metal, and this in turn brought in a considerable amount of consumer buying and also a little speculative buying for the forward position. As soon as it became apparent that the buffer stock was nearing the end of its resources, the pressure of buying increased and, although the end came sooner than most people expected, it was only by a matter of a few days. Following the breakthrough of the £880 per ton price for cash metal, the market rose quickly about £20 per ton, but on Wednesday the market was extremely orderly, the turnover was back to normal and price movements were small.

It now remains to be seen whether the recent precautionary buying has been sufficient to enable consumers and merchants to remain out of the market for the next few weeks. If this proves to be the case, the tin market will once more truly represent the supply and demand situation from day to day. It is still too early to hazard a guess as to the outcome of the last meeting of the first International Tin Council at the end of the month and the first meeting of the second International Tin Council scheduled for July 3, but it would appear that its efforts must now be directed towards obtaining sufficient tin from the American stockpile to cover any deficit between production and consumption for the next few years.

Stocks in official warehouses fell a further 644 tons to a total of 8,090 tons, reflecting further shipments to the Continent, but it must be realized that instead of the majority of the stock being held by the buffer pool all of it is now in the hands of the market. This should have a steadying effect and points to the maintenance of a contango, but should any appreciable demand develop for metal for delivery during the next three months, this may be considerably reduced or even completely eliminated.

On Thursday the eastern price was equivalent to £937½ per ton c.i.f. Europe.

COPPER MAY GO BETTER

The copper price fell back at the beginning of the week, probably due to sales of cash metal which were made in connection with the financing of purchases of cash tin, and this opinion is strengthened by the recovery which took place on Wednesday in the price level although the contango itself remained wide. The figures issued by the Copper Institute for the month of May gave no pointer to what is happening in the industry. The fall in stocks outside the U.S. being matched by additional deliveries to fabricators, whilst in the U.S. the stocks fell in spite of a sharp increase in the rate of production. The figures, with the April figures in parentheses, were:—

	s.tons	
Inside U.S.		
Refined production	148,961	(128,440)
Domestic deliveries	131,317	(125,905)
End-month stocks ...	106,982	(114,247)
Outside U.S.		
Refined production	169,550	(164,158)
Deliveries to fabricators	209,046	(197,701)
End-month stocks ...	322,341	(333,557)

In the U.K. stocks in official warehouses rose by 550 tons at the beginning of the week to a total of 17,427 tons.

The whole price structure has shown some weakening, isasmuch as the custom smelters intake price for copper in the U.S. has fallen to 25½-26 c. per lb., which brings it very much in line with the 31 c. per lb. level maintained for new copper. Demand in Europe and Japan has not been quite as brisk as of late, but interest increased when the price fell, and most people consider that a price of £235 per ton for three months copper is at the bottom end of the present price bracket. In addition, the labour situation in Chile and in Rhodesia shows signs of becoming more difficult and the possibility of a strike in either or both countries cannot be completely ruled out.

BARTER NEWS HELPS LEAD

The lead market has developed a slightly better undertone and prices have advanced slightly. It is understood that there is a possibility of the U.S. Administration concluding a barter agreement with both Canada and Australia in the near future (see page 735) which, added to a difficulty on the Continent in buying prompt metal, has given rise to a better feeling. Stocks in the U.K. rose by 450 tons to a total of 11,843 tons and the contango on the London market has showed signs of widening, which again may be in connection with dealers operations in the tin market.

ZINC LOWER

The zinc market remains friendless and with ample metal still being available from behind the Iron Curtain and with the news from the motor industry not being too bright, prices have continued to slide. Stocks in the U.K. fell 533 tons to a total of 7,193 tons and the contango has remained unchanged.

OFFICIAL TURNOVERS

Official turnovers (in l.tons) for the week ending June 16, with the previous week's figures in parentheses, are:—

Copper	17,625	(15,150)
Tin	2,555	(2,740)
Lead	11,975	(9,050)
Zinc	8,150	(10,950)

Closing prices are as follows:

	June 15 *Buyers*	June 15 *Sellers*	June 22 *Buyers*	June 22 *Sellers*
COPPER				
Cash	£235½	£235¾	£238¾	£239
Three months ..	£237½	£237¾	£242	£242½
Settlement ..	£235½		£239	
LEAD				
Current ½ month	£63¾	£63¾	£64½	£64¾
Three months ..	£64⅜	£64¾	£65½	£65¾
TIN				
Cash	£879½	£880	£915	£916
Three months ..	£887½	£888	£924	£925
Settlement ..	£880		£916	
ZINC				
Current ½ month	£77⅞	£78	£77½	£78
Three months ..	£79	£79½	£78½	£79

LONDON METAL AND ORE PRICES, JUNE 22, 1961

METAL PRICES

Aluminium, 99.5%, £186 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £230 per ton
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 0d. lb.
Cerium (99%) net, £15 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 12s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram
Gold, 251s 6½d.
Iridium, £20/£23 oz. nom.
Lanthanum (98%/99%) 15s. per gram.
Magnesium, 2s. 2½d./2s. 3d. lb.
Manganese Metal (96%/98%) £275/£285
Nickel, 99.5% (home trade) £600 per ton
Osmium, £17/£22 oz. nom.
Osmiridium, nom.
Palladium, Imported, £8 12s. 6d.
Platinum U.K. and Empire Refined £30 5s.
Imported £27½/£28
Quicksilver, £67 ex-warehouse
Rhodium, £43/£45 oz.
Ruthenium, £14/£16 oz. nom.
Selenium, 46s. 6d. per lb.
Silver, 79½d. f. oz. spot and 80d. f'd.
Tellurium, 37s. 6d. lb.

ORES AND OXIDES

Antimony Ore (60%) basis .. .. 30s. 0d./35s. 0d per unit c.i.f.
Beryl (min. 10 per cent BeO) .. .. 270s./275s. per l. ton unit BeO
Bismuth .. .. 30% 5s. 0d. lb. c.i.f.
20% 3s. 3d. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (semifriable 48%) (Ratio 3 : 1) .. .. £15 5s. 0d. per ton c.i.f.
" Hard Lumpy 45% .. .. (Ratio 3 : 1) .. .. £15 10s. 0d. per ton c.i.f.
" Refractory 40% .. .. £11 0s. 0d. per ton c.i.f.
" Smalls 44% .. .. .. (Ratio 3 : 1) .. .. £13 5s. 0d. per ton c.i.f.
Baluchistan 48% .. .. .. (Ratio 3 : 1) .. .. £11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides (Ratio 10 : 1) Nb_2O_5 : Ta_2O_5 165s./167s. 6d. per l. ton unit c.i.f.

Fluorspar—
Acid Grade, Flotated Material .. .. £22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2) .. .. 156s. 0d. ex. works
Lithium Ore—
Petalite min. 3½% Li_2O .. .. 50s. 0d./55s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O .. .. 50s. 0d./55s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O .. .. 75s./85s. per ton f.o.b. Beira
Magnesite, ground calcined .. .. £28 0s./£30 0s. d/d
Magnesite Raw (ground) .. .. £21 0s./£23 0s. d/d
Manganese Ore Indian—
Europe (46%-48%) basis 60s. 0d. freight .. .. 73d./75d. c.i.f. nom.
Manganese Ore (43%-45%) .. .. 69d./71d. c.i.f. nom.
Manganese Ore (38%-40%) .. .. nom.
Molybdenite (85%) basis .. .. 10s. 0d. per lb. (f.o.b.)
Titanium Ore—
Rutile 95/97% TiO_2 (prompt delivery) .. .. £23 per ton c.i.f. Aust'n
Ilmenite 50/52% TiO_2 .. .. £11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%) .. .. 128s. 6d./132s. 6d. per unit c.i.f
Vanadium—
Fused oxide 95% V_2O_5 .. .. 7s. 6d./8s. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) 65-66% ZrO_2 .. .. £16 ton c.i.f

Mining Finance

A Stitch in Time Saves Nine

It is most unfortunate that South Africa has been forced to impose restrictions on the withdrawal of foreign capital, but it cannot come as a shock. In fact, possibly the most surprising point is that it has not come, in one form or another, before. The answer to this may lie in the suggestion that it has been forced upon the government as a condition of the proposed loan by the I.M.F. If this is the case, then it is to be hoped that the customary veil of secrecy which surrounds the doings of central bankers will be lifted on this occasion in order that it may be known that South Africa has not readily broken faith in respect of its declared intentions. Whatever the background to the introduction of these controls at this stage, it has undoubtedly hit at the root cause of the Republic's balance of payments problem. There should be little question that, together with the import restrictions, these controls will not only reverse the present drain on the foreign reserves but should pave the way to a substantial credit. In this sense it is in the interest of the overseas shareholders that the South African economy should be re-established on a firm footing as soon as possible. Upon this rests the security of the Republic. Regardless of the particular approach that is made to the solution of the racial problem throughout Africa, they are all dependent upon an active and expanding economy.

The effect of these controls upon the stock markets has been to eliminate all normal arbitrage operations and thus sever the links between Johannesburg and the other markets. Johannesburg is now relieved of the depressing effect of continual and almost indiscriminate selling from London and, particularly recently, from the Continent. In the past the effect of this selling has not only been to depress the market but it has also had the tendancy to eliminate the differences which should exist between the different stocks on technical grounds. Operating as an independant unit Johannesburg should now become a far more effective index of the intrinsic value of the various shares.

The other major factor in the Cape will be that the institutional buyers will no longer be able to turn to London and thus these funds will be directed onto the local exchange and may well lead to a minor boom. The only eventuality which might change this position is if the government were to take powers to direct these funds into its own securities. This seems unlikely, despite the government's heavy investment programme in the public sector.

It is far more probable that the government will allow the institutional funds to continue to flow onto the market thus pushing up prices—possibly quite quickly—to the point where the yields on mining equities drop to say 7½ or 8 per cent. At such a level they would no longer be very much more attractive than government securities, the latest issue of which was 5¼ per cent. If it is assumed that stability might be reached at comparative yields of, say, gilt-edged 5½ per cent, finance houses 6½ per cent, operating mines 8 per cent; then the equity market of the operating mines has only to rise by a little over 20 per cent for government securities to become attractive. This is one indicator of the amount that the Cape market is likely to rise. Should it do so, it may present a far more favourable climate for some of the finance companies to raise urgently needed funds either by a loan issue or an offer of shares.

At higher market prices it will be possible for the companies to make an offer with a large enough premium to protect the interests of the existing holders and yet still a little below the market price and thus be attractive.

The effect that the new capital movement restrictions will have upon London and the Continental exchanges is not so clear. Initially there has been a protective marking down by the jobbers and a differential approaching 20 per cent has been established between the Cape and London. However, the level at which this differential finally settles will be a function of many factors, though it does seem clear that this discount will be uniform between stocks.

This uniformity will be maintained as the regulations do not prevent non-residents purchasing Cape scrip with blocked security Rand, and thus switching their holding from one stock to another in Johannesburg.

The main question which arises in the London Kaffir market is whether the stocks will continue to be valued on a 10 to 12 per cent yield basis regardless of the gains on Johannesburg or whether a discount, in the order of say 15 per cent, will be established between the markets before London follows Johannesburg. The answer probably lies between the two. Whether in fact London will actually rise should the Cape improvement be greater than the differential is a moot point. There is, in fact, no technical reason why it should not. Certainly if it does it would be indicative of a new confidence in the Rand which would not be unreasonable as the South African government has shown itself determined to protect its new currency at all costs.

London Market Highlights

The weekend news of South Africa's new controls on capital movements knocked the London Kaffir market sideways for a while on Monday. It was realized only too well that the exchange control moves would effectively isolate Johannesburg by halting arbitrage operations. This meant that virtually the only substantial buying support in recent times—the Cape institutional investors—would be confined to Johannesburg; London and the Continent would now, to all intents and purposes, have only the sellers.

With these gloomy thoughts in mind, London jobbers on Monday promptly marked down share prices by several shillings throughout the list and widened their dealing margins. Partly because of this, there was very little selling and towards the close of the day the market showed signs of pulling itself together. Even so, Western Holdings were still as much as 15s. 6d. down at 103s. 3d. after sinking to 101s. 3d. and among the many smaller falls President Brand were showing a loss of 5s. 9d. at 44s. In the Finance group, Anglo American tumbled 10s. to 118s. 9d. and Union Corporation came back 6s. 3d. to 42s. 6d.

Johannesburg, on the other hand, reflected the check to arrivals of overseas-held stock and prices moved steadily ahead. The result was that at the close of the day London prices were between 10 and 20 per cent below those in Johannesburg, Western Holdings being priced at 124s. in that centre. Since then the London market has steadily recovered and it is worth pointing out that even on Black Monday prices still had not fallen to the level of a few weeks back.

Despite the difficulties of interpreting the new regulations there are hopes that some form of arbitrage may yet be possible between the two centres, as explained more fully on this page it is generally considered unlikely that they will move in opposite directions. Certainly the burst of strength in the Cape on Tuesday morning caused by revived talk of a Rand devaluation was followed by a strong recovery in a market short of stock here.

The other outstanding market feature of the week was the rush to buy tin shares. It followed the exhaustion of the buffer stock manager's metal stock and the consequent spurt in the price of cash tin through the £880 a ton ceiling to over £900 a ton. In three days, Tronoh soared from 66s. to 82s. 6d., Southern Kinta from 36s. 3d. to 50s. 6d. and Ayer Hitam from 50s. to 64s., among many lesser gains. So fast and furious has the rise become that profit takers will invariably appear soon.

The plan to lower the value of the Canadian dollar resulted in the share-market for Canadian dollar stocks becoming nominal for a while. Dealers cautiously preferred to wait for the exchange position to become clearer. Meanwhile it is worth pointing out that as far as the mining issues, at least, are concerned, the dollar plans are a bull point. Uranium and base metal exports, for example, which are sold for U.S. dollars will be worth more to the mines. But the already subsidized gold producers will be little affected.

COMPETITION FOR COMALCO?

At the close of dealing last week the shares of Consolidated Zinc, the Australian lead-zinc producer, eased a little on the news that Alcoa were to establish in Australia an itegrated aluminium complex. As is discussed on page 713 a new company, Alcoa of Australia (Pty.) Ltd., has been formed to develop a new aluminium mining industry. Alcoa itself will hold 51 per cent of the shares of this company whilst the remainder will be held between Western Mining, North Broken Hill and Broken Hill South. The plans of the new company envisage that the bauxite will be mined and refined at Kwinana, Western Australia and will then be shipped 1,700 miles for smelting at a plant to be built at Geelong near Melbourne. It is intended to develop the 400,000,000 ton Angelsey brown coal deposit as a source of power for smelting the alumina. The new plant should be in operation, at an output rate of 40,000 tons per annum, in 1964.

It is this date that is perhaps the most surprising part of the announcement for at best it only allows 3½ years for the development of the programme and the actual installation of the plant, not only at Kwinana but also at Geelong. The

projected date for the first production from the Comalco smelter in New Zealand is mid-1966 and thus it is largely on the basis of timing that Alcoa can be regarded as competition for Comalco.

Is this competition very serious even assuming the Alcoa is in production in late 1964? Probably not, even though Comalco cannot improve their time schedule as it is closely linked with the Manapouri — Te Anau hydro-electric scheme. In the long term the expansion of the Eastern markets will undoubtedly be sufficient for both the Alcoa and the Comalco production and in the matter of costs Comalco must have a clear advantage. Alcoa have not announced whether theirs will be a high or a middle cost producer but at best the cost of electricity from brown coal will be in the order of 0.4 pence per unit as compared with something close to 0.25 for New Zealand hydro-electric power. This aspect is particularly important for approximately 10 kWh. are required for the production of a single pound of aluminium, and in high power cost areas energy costs can represent as much as 20 per cent of ingot value.

Possibly the most likely effect upon Comalco of the Alcoa announcement is that it will be forced to postpone somewhat its plans for further development at Bell Bay, Tasmania. At present this plant is being expanded to a capacity of 28,000 tons per annum and it was envisaged that the plant would be further expanded to 40,000 tons.

From Western Mining's point of view, an interesting aspect to the Alcoa scheme is that the mining of the bauxite will provide a suitable task for the large open cast equipment which will probably become available shortly from Great Western Consolidated. It was with this in mind that Western Mining and Great Western tendered recently for an iron ore in Western Australia. As yet there has been no definite announcement about this tender.

A YEAR OF CONSOLIDATION AND IMPROVED PROFITS

After the very eventful year ended March 1960 when Henderson's Transvaal acquired substantial participations in the Kinross mines, made a one-for-seven scrip issue and completed the difficult take-over of Witbank Consolidated, the year to March 1961 must be regarded as one of consolidation. The net profit for the group after taxation and allowments are more than paying their way. assets has increased from £118,808 to £139,409. This increase in profit has allowed last year's record dividend to be maintained and the balance carried forward has increased by over £20,000.

During 1960 South Africa's coal production reached the record level of 42,000,000 tons to which the Henderson group contributed 1,920,000 tons. The output of Henderson's collieries continues to expand and in May the Tweefontein United output reached the record level of 139,935 tons. Further to the drilling that was carried out last year to prove the reserves of the No. 4 seam at Tweefontein, shafts are now being raised from the No. 2 seam in order to estimate the full potential of the No. 4 seam. This will also increase the production capacity.

At the Witbank Consolidated mine over sixty per cent of the production comes from a fully mechanized section, and whilst it will be necessary to make considerable renewals to plant and equipment over the next two or three years this small yet efficient mine is a valuable addition to the Henderson group. At present the possibility of re-developing the adjoining Ogles property is being investigated.

On the investment side, there has been an increase in income of almost £10,000 though the market value of the investments has fallen by over £200,000. This fall in investment value is not peculiar to Henderson's. It is a reflection of the South African market conditions where 81 per cent of the group's portfolio is held. This fall in value is not serious in relation to the book value and in any case, as income-earning assets, the investments are more than paying their way. This position should be further improved when the promising Bracken and Leslie mines enter the dividend lists.

Extracts from the statement by Sir Joseph Ball, the chairman are on page 743.

WESTERN SELECTION

At the meeting on June 16, the board's proposal to reduce the capital and distribute 1s. per unit of stock was approved. This forms part of Western Selection's new policy following the take-over of its gold mining interests by the Ghana government.

As was discussed in these columns on May 26, the company has for re-investment, after the return of 1s. per 5s. stock unit, approximately £450,000. Rather than placing this money in further mining ventures overseas, Western Selection is to concentrate on investment in the United Kingdom, taking direct interests in commercial and industrial undertakings should the opportunity arise.

The company's activities in Canada are continuing. At the Valient Gold Mines results have been encouraging. An orebody has been proved on the main vein west of the shaft and good intersections have been obtained on other veins. At present, it is proposed to continue the drilling programme to explore the monozite intrusive mass as it was in similar formations that the gold mines of the Val D'Or district have found the best conditions.

CENTRAL MINING INVESTMENTS AND EARNINGS

The Central Mining portfolio has certainly suffered with the fall of the Kaffir market, but at first sight the fall is not as great as some of the other finance houses. This is accounted for by two main factors. Firstly Central Mining's stake in Africa accounts for only 63.5 per cent of its portfolio, 50 per cent being in the Republic of South Africa. Secondly the book value of the portfolio has increased by £1,610,310. Another factor which cannot be overlooked is that, being a March year end company, the first effects of Sharpeville were reflected in the March 1960 accounts.

From an income standpoint over 80 per cent of the company s revenue is derived from Africa. This high proportion is a reflection of the higher yields maintaining throughout Southern Africa, though the increase from last year reflects the sharp increase in dividend payment by Rhoanglo, from 5s. to 8s. Another notable increased dividend within the Central Mining portfolio was Western Holdings from 8s. 6d. to 9s. 6d. Through Beralt Tin and Wolfram, Central Mining has a small interest in the rapidly rising tin market. The dividend payed by this company has increased from 1s. to 3s.

RHOCORP DIVIDEND PROSPECTS

The financial year ended September 30, 1960 was a most difficult one for Rhodesian Corporation. Due to an unfortunate succession of circumstances the company found small comfort in its widely diverse interests. A very serious drought in Southern Rhodesia adversely affected its agricultural interests, mining conditions in the main section of the Fred and Redwing mine had made it both dangerous and uneconomic to continue operations and the economic recession associated with the political uncertainty in the Federation seriously affected the brick works.

However, in his address to the annual meeting the chairman, Mr. C. J. Burns, was able to describe the current year in more optimistic terms. Perhaps the greatest contributor to this optimism is the Southern Rhodesian climate, for this year has been ideal for maize and tobacco crops and a material contribution to the revenue is expected from this sector. The building industry remains one of the major casualties of the recession, but despite the difficulties, the Rhodesian Brick and Potteries Company is still operating profitably. Production costs have been reduced and whilst it may be some time before full production can be resumed, the company is well placed to take immediate advantage of an upturn in demand.

Against this background the chairman has said that there should be a resumption of dividend payments in respect of this year. A further pointer to the dividend payment is the good results of Falcon Mines in which Rhocorp has a large shareholding. If the dividend returned to its 1959 level the shares, at their present value of 2s., stand to yield 16 per cent.

CONCESSIONS FOR CORNISH TIN?

The Chancellor of the Exchequer has emphasized that he "can make no promise" but he has agreed to examine the position of the British non-ferrous mining industry.

In moving a clause to the Finance Bill to exempt non-ferrous metal mines from profits tax for the first 3 years of operation, Mr. Harold Wilson (Labour) drew attention to the current tin shortage and emphasized that it was essential in the interests of full employment in Britain that there should not be a shortage of tin in this country.

At present the output of tin from Cornwall is about 1,200 tons per year which is less than 1 per cent of the world production. It has been estimated by the Cornish Mining Development Association that this could be increased by at least three-fold if given reasonable tax concessions.

AMERICAN CAPITAL FOR THE CONGO

A new organization, the Belgo-American Development Corporation, has been formed in the United States in order to encourage American investment capi-

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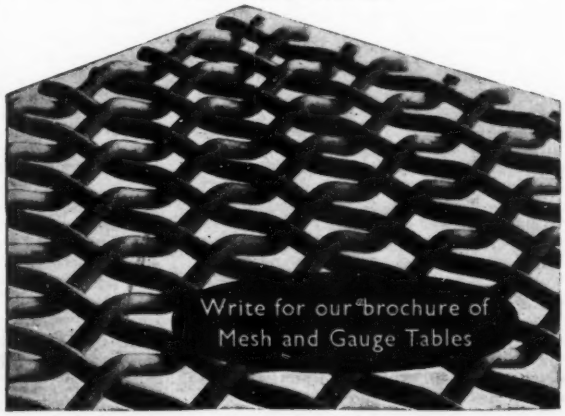

tal into the Congo. This corporation has been formed by companies associated with the Societe General de Belgique, the large holding company which controls, amongst other interests, the Union Miniere du Katanga.

Admiral Kirk, heading the corporation, has made it clear that the new concern "is not itself an entrepreneur, but that its mission is to provide a clearing house in the U.S. for the issuance and exchange of information.... concerning companies operating in the Congo". In trying to attract capital to the Congo the point is being made, that not only is it economically a good investment, it is also in the interest of the West to bolster the private capital in the Congo in order to prevent the area from aligning itself with the Communist *bloc*. It appears to have been taken for granted that there will be political stability in the Congo in the future.

Undoubtedly, it is in the interest of the West to support the private sector in the Congo but whether the Belgians will be able to convince Wall Street that it is economically a sound investment at this juncture is another matter. With his investments blocked in both the United Kingdom and South Africa, the American is more likely to look in the United States first, particularly as the recession now appears to be waning.

URANIUM IN RESERVE

It has been reported that there is a large uranium deposit in the Namib Desert of South West Africa and that it is being held in reserve until such time as the uranium market improves and gives the deposit an economic value.

The deposit is of considerable size and borehole results have been in the order of 10 lbs. U_3O_8 per ton, thus placing the deposit in the same order as that at Gas Hills, Wyoming, U.S.A. These values are considerably in excess of those of the present primary producers in Australia and the Elliot Lake area of Canada but it must be many years before the demand for uranium is such as to warrent further capital expenditure in new fields. There is not even the argument that it would be of strategic importance to South Africa for the gold mines are already important producers.

The mineral concession is held by the Louw Syndicate. Anglo American were granted an option on the area and spent some £75,000 on an extensive prospecting survey but decided to drop the option when the Rand gold mines began overproducing.

COPPER-ZINC DISCOVERY FOR SHERRITT GORDON

Sherritt Gordon's airborne geophysical equipment has located an anomaly which has proved to be a sulphide deposit carrying erratic values of copper and zinc. Diamond drilling is at present in progress but a considerable amount of work will have to be done before it can be determined whether or not a deposit of mineable tonnage exists. The results of the most recent drilling have been encouraging.

The profits for the first quarter of 1961 are down by comparison with the same period for the previous year. This is mainly due to a drop in the metal sales and the lack of any custom treatment business. The net earnings per share have fallen from 8.5 c. to 6.1 c.

At Lynn Lake the average mill treatment rate has fallen but improved recoveries of both nickel and copper have maintained approximately the same metal content in concentrates as during the first quarter of 1960. No new orebodies have been found during the quarter but the main drive on the 2,000 ft. level has been completed and it will now be possible to explore the area below the EL orebody.

At Fort Saskatchewan the powder rolling mill was operated as a pilot plant in order to develop an operating technique for the production of cobalt and nickel strip, rod and wire. A number of potential market outlets for these rolled products have been found and it is hoped to commence production on a commerical scale during this present quarter.

A dividend of 10 c. per share was paid on June 1, 1961.

British Aluminium.—For a sum of £10,000,000 British Aluminium is to purchase the whole of Reynolds T.I. Aluminium with the exception of its holding in British Aluminium. This completes the merger which followed the acquisition of control of British Aluminium by Tube Investments Ltd. and will increase the consolidated net assets of British Aluminium from about £42,000,000 to £52,000,000.

F.S. Saaiplaas.—Noteholders are reminded that the right to convert the 6½ per cent unsecured convertible notes expires on June 30, 1961.

Western Deeps.—The board of directors has announced that of the 5,600,000 "B" shares offered at 30s. to holders of both the "A" and the "B" shares, 73 per cent have been taken up. The balance of 27 per cent has been subscribed in terms of the underwriting agreement. Mr. Oppenheimer has told shareholders that only £340,000 was subscribed by the general public.

Afrikander Lease.—It has been estimated that the value of the uranium royalty from Buffelsfontein will amount to approximately £300,000 per annum, after paying company tax at the rate of 6s. in the £, for a period of four years. The directors have decided to distribute this sum by way of dividend and capital repayments in equal proportions. The amount available for distribution per share will probably exceed the par value of these shares which at present is 5s. A final dividend, in respect of the year ended June 30, 1961, has been declared at 12½ per cent, equal to 7½d. per share.

Clydesdale (Transvaal) Collieries.—The estimated profit for the year ended June 1961 has increased from £257,000 to £450,000 after providing for taxation. Taxation for the year amounted to £90,000 as compared with £34,000 for the previous year.

Waverley Gold Mines.—As a result of a serious movement in the footwall to the east of the main shaft during April there has been a serious caving which has not only caused a loss of faces but also a blockage in the orepass between 5 and 3 levels. Being a reclamation company it is very vulnerable to serious interruptions to normal work. The net effect has been to change what was a small profit over the first three quarters of the year into a loss and having regard to all the circumstances the board has decided to give the statutory three months notice of the possibility of ceasing mining operations. However, the directors have emphasized that this does not necessarily mean closure in three months.

Diamond Interims.—Three of the De Beers diamond group have announced their interim dividends. De Beers Consolidated itself has declared an interim at 10s. per 40 per cent preference share while De Beers Industrial has declared 1s. per ordinary share and Consolidated Diamond Mines 5s. per share. These dividends are all maintained at last years level.

Stilfontein and the Lucas Block Companies.—The circulated chairman's statements of Stilfontein, Eastern Rand Extensions and Southern Van Ryn are published on page 742. The annual reports of these companies were discussed in these columns in our issue of May 26, and June 9, 1961.

★

Austral Development Ltd. announce with regret the recent death of Mr. A. R. West, director of North Broken Hill Ltd. and manager of the mine at Broken Hill, N.S.W., Australia.

Sir Rupert Clarke, a director of The National Bank of Australasia, has accepted an invitation to join the board of The Rio Tinto Mining Co. of Australia Ltd.

MINE CAPTAIN required by British Gold Mining Company in Ghana. Applicants should hold a degree in mining and have at least 5 years' metal mining experience. High pay to suitably qualified man. 12 months' foreign tours and 3 months' paid leave. Continuous contract. Passages and accommodation provided for applicant and wife. Write with particulars of qualifications, experience and age to Box No. 698, *The Mining Journal*, 15 Wilson Street, London, E.C.2.

EXPERIENCED GEOLOGISTS required by British Gold Mining Company in Ghana for underground and field work. High pay to suitably qualified man. 12 months' foreign tours and 3 months' paid leave. Continuous contract. Passages and accommodation provided for applicant and wife. Write with particulars of qualifications, experience and age to Box No. 697, *The Mining Journal*, 15 Wilson Street, London, E.C.2.

SITUATIONS VACANT

Metal Mining or Quarrying Engineer required to fill a vacancy on the editorial staff of a monthly technical journal covering the metalliferous mining and quarrying industries. Applicants should be under 30 years of age, possess an A.R.S.M. or equivalent and have had practical experience either abroad or in the U.K. Writing ability is desirable as the job entails preparing descriptions of mines and quarries visited and editing contributed articles. Details of training and past positions to Box No. 696, *The Mining Journal*, 15 Wilson Street, London, E.C.2.

STILFONTEIN GOLD MINING COMPANY, LIMITED

(Incorporated in the Republic of South Africa)

Mr. J. Scott, Chairman of the Company, presided at the 12th Annual General Meeting of Stilfontein Gold Mining Company Limited, held at 6 Hollard Street, Johannesburg, on June 13, 1961. The following is his circulated statement :

At the last Annual General Meeting I gave Shareholders details of the satisfactory progress which had been made during 1959 in regard to the two major mining problems which had first been reported at the Annual General Meeting in June of that year; these problems being the zone of low payability in the Margaret Shaft area and the increased flow of water into the mine.

I am glad to be able to tell you now that the improvement in our position in relation to these problems, as reported a year ago, has been maintained. So far as grade is concerned, a more satisfactory position is reflected both in development results and in ore reserves, but stoping operations in the low grade zone are still affecting the current recovery grade and must for some time continue to do so. In regard to water we have extended our facilities for the handling and pumping of water to a point that provides us with a wide margin of safety. These problems have continued to add to working costs, the increase being somewhat less than in the previous year, but an improvement in tonnage milled in a large measure compensated for this further increase and for the shortfall of revenue resulting from the fall in grade. The profits have in consequence been maintained at very nearly their previous level and I feel justified in describing the year on a whole as one of recovery and consolidation.

Tonnage milled increased from 1,754,000 to 1,958,000 and as anticipated the recovery grade dropped from 9.474 dwt/ton to 9.046 dwt/ton. Working costs increased by 2s. 6d. per ton milled. The net result was a reduction of £141,651 in working profits from gold against which uranium and acid profits increased by £21,615, resulting in an overall drop of £120,036.

During the year primary development totalling 107,610 feet was carried out, as against 102,607 feet accomplished in 1959. There was an encouraging increase in both payability and average payable value as compared with the previous year. The payability increased from 72.2 per cent. to 83.1 per cent. and the average payable gold value increased from 346 inch/dwt to 441 inch/dwt. Although the ore reserves remained at practically the same tonnage, there was an improvement in value from 9.45 dwt/ton to 9.68 dwt/ton.

Capital expenditure for the year amounted to £2,246,129, which was financed to the extent of £400,000 by additional long-term borrowings on security of portion of the Company's European housing and to the extent of £200,000 by a short-term loan, since repaid.

The overall net profit for the year under review was £5,941,658 which, when added to the undistributed balance of £43,166 brought forward from the previous financial year made £5,984,824 available for appropriation. A net amount of £1,685,776 was appropriated for capital expenditure, £540,855 for uranium and acid loan repayments and £1,959,438, equivalent to 3s. per share, for dividends. Tax and lease payments accounted for £1,684,424 and the balance of £114,331 was carried forward, with other revenue reserves, to the current financial year.

The principal capital works of the past year were the sinking of the Toni Shaft to its final depth, the provision of additional pumping facilities and the completion of the extension of the reduction plant to its ultimate nominal capacity of 180,000 tons.

The capital programme for the current year covers, in the first instance, the completion of various works now in progress including, at the Toni Shaft, the cutting of ore and waste passes and station development, at the Margaret Shaft the cutting of sumps and at the James Shaft the conversion to an uncast ventilation shaft. As this shaft will for some time be required to serve the upper levels of the mine with men and materials, airlocks are being provided and the small headgear is being enclosed.

The balance and the major portion of the programme is concerned with the Scott Shaft where good progress has been made on the collar, headgear and the installation of sinking hoists. Full-scale sinking should start about the middle of the year. Expenditure on this shaft will continue on a substantial scale until early 1964.

It is estimated that capital expenditure during 1961 will amount to approximately two-and-a-half million pounds, the major portion of which will be expended on the aforementioned programme. It is intended that, to the extent of half a million pounds, this programme will be financed by long-term housing loans.

In an announcement made by the Company on February 1, 1961, Shareholders were advised that a new agreement had been concluded with the Atomic Energy Board in terms of which the balance of the Company's selling quota of 690 tons of uranium would be produced over the ten years commencing January 1, 1961, and sold at a fixed price of 80.986s. per lb. f.o.b. Durban. The production of this tonnage from the treatment of uranium-bearing slimes at Stilfontein would, after meeting tax and loan requirements, have resulted in a negligible contribution to the distributable profits of the Company. The Company has therefore arranged to dispose of its remaining quota rights to Buffelsfontein Gold Mining Company Limited.

Details of the arrangements with the Buffelsfontein Company appear in the Directors' Report and I feel it unnecessary to refer to them in this review, except to say that they will give rise to a significant addition to the income of the Company from 1965 to 1970. Prior to 1965 the income from uranium will be negligible.

As all members of the Stilfontein Joint Uranium Production Scheme have disposed of their quota rights, the joint uranium treatment plant and the acid plant have been closed down since the year end. Every effort was made to re-engage at Stilfontein and other mines of the Group the employees affected as a result of the shut-down. I am glad to report that the bulk of these employees have been suitably re-employed.

The future of the uranium plant is being discussed by the Company and the other members of the Joint Scheme, the latter having defined percentage interests in the residual value. The various possibilities under consideration include the maintenance of the plant as it now stands on behalf of all interested parties, total disposal followed by distribution of the proceeds, and physical subdivision in so far as is practicable. In the latter event, the Company will have the further alternative of retaining or disposing of the portion which accrues to it. You will appreciate that the problem is complex and that I cannot at this stage offer any opinion as to the probable outcome.

In regard to the acid plant, no joint interests exist and the Company is considering the alternatives of retention or disposal. It is also formulating a claim for compensation in respect of the premature closing down of the plant and here again any more positive statement as to the possible outcome cannot at present be made.

Mention is made in the Directors' Report of the home ownership scheme which was introduced last year to assist employees in acquiring their own homes. I am glad to report that this appears to have been well received by our employees as 57 applications have been dealt with since the inception of this scheme.

In conclusion, I should like to record my appreciation of the loyal and efficient services rendered during the year by the Consulting Engineers, the Mine Manager and their respective staffs and the Head Office Secretaries both in Johannesburg and London.

EASTERN RAND EXTENSIONS LIMITED

(Incorporated in the Republic of South Africa)

Mr. J. Scott, Chairman of the Company, presided at the 27th Annual General Meeting of Eastern Rand Extensions Limited, held at 6 Hollard Street, Johannesburg, on June 13, 1961. The following is his circulated statement :

At the present stage in its activities this Company is basically an investment corporation with substantial holdings in mining and finance companies interested for the greater part, directly or indirectly, in the producing mines of the Lucas Block area. Existing market conditions are therefore a mater of vital importance to the Company and it is with deep concern that I make reference to the current depreciation in the market value of our holdings. Additional investments to the extent of £23,065 during the year raised the total book value of quoted securities to £566,973, but the relative market value declined from £1,713,716 at the 1959 year end to £1,487,985 in 1960 and has since dropped to £1,248,020. All of this is in conformity with the downward market trend in South African shares directly attributable to the political events and atmosphere of the past year. These circumstances are of course beyond the control of your Directors, nor have they considered it to be either practicable or prudent to endeavour to shield the Company from the consequences of these disturbing events by any attempt to realize holdings; in fact, as stated above, a small amount of surplus cash available during the year was invested in the shares of various producing mines and a further amount of approximately £19,000 has been similarly invested since the year end. It would appear that the only course

open to the Company at the moment is to maintain its holdings substantially unchanged and to rely upon their intrinsic merit which remains unaffected by political turmoil.

In the Income and Expenditure Account, you will note a decline in dividend income, due to smaller declarations by the Stilfontein and Hartebeestfontein Companies, and the writing off of approximately £60,000 related almost entirely to the final abandonment of our attempts to establish the existence of payable gold deposits on the farms Video and Vermeulenskraal Noord. The Company's participation in similar ventures in the past gave rise to its valuable holdings in the Lucas Block area and to the rights that flowed to Shareholders therefrom. Our failure in the present instance is a reminder of the hazards necessarily associated with prospecting. This venture had been in progress for approximately 15 years and the Directors considered it to be in the interests of Shareholders that they should draw on reserves to the extent of £30,000 so as to relieve the profits for the year, to that extent, of this non-recurrent debit. In the result we have maintained the total dividend distribution unchanged at 1s. 9d. per share and carried forward undistributed profits amounting to £27,797.

Progress has been made during the year in our attempts to dispose of certain minor assets. The first of these consists of four stands situated in Cross Street, Kroonstad, which have been held by the Company for many years. Two of these have been sold, subject only to a suitable change in the Municipal town planning scheme and the remaining two are under option. The proceeds of the two transactions, if they are finalized, will represent a disposal of the asset at slightly less than cost.

In the second case, application has been made for drive-in cinema rights on a property in the Boksburg municipal area, in which property the Company has a 50 per cent interest. Here again, we hope to effect a realization at a relatively small discount.

SOUTHERN VAN RYN REEF GOLD MINING COMPANY, LIMITED

(Incorporated in the Republic of South Africa)

Mr. J. Scott, Chairman of the Company, presided at the 45th Annual General Meeting of Southern Van Ryn Reef Gold Mining Company Limited held at 6 Hollard Street, Johannesburg, on June 13, 1961. The following is his circulated Statement:

You will have noted from the Report and Accounts that the recurrent income of the Company by way of dividends, interest and Sundry Revenue at £145,822, shows a decrease of approximately £15,000 as compared with the 1959 peak. This is due mainly to reduced dividend declarations by the Stilfontein and Hartebeestfontein companies. As against this, share realizations in a favourable market in the early months of the year, reported at the last Annual Meeting, realized a net profit of £50,963. The bulk of this amount was reinvested and a round amount of £50,000 placed to General Reserve. On the other side you will have noticed that it was necessary to write off an amount of £2,709 representing the Company's share of prospecting expenditure on the Lucas Block Extension. The dividend was fractionally increased from 7d. to 6 cents.

The feature of the year of the earlier months of the current year has unfortunately been the uncertainty and progressive weakness of the market for shares in South African mining and finance companies. Despite a net increase in the book value of quoted investments, the market valuation of your portfolio declined from £1,905,085 in December, 1959 to £1,626,584 and has since, without any changes in the holdings, fallen to £1,336,928. The Company has over the years built up a portfolio of investments of the highest quality based mainly on the high-grade long-life mines of the Lucas Block Area. Subject to the normal vicissitudes of mining the capital value of the equity and its dividend potential should have been assured for a period approaching 20 years. There are more than 8,000 shareholders in this Company and they have with justification regarded their holdings as being on the investment rather than the speculative level. It is tragic that political turmoil has so gravely disturbed this sense of security.

Your Directors are unable to shield the Company from the repercussions of the present march of events. They desire, however, to place on record that their faith in the basic soundness of the mining undertakings in which the company's funds are invested remains unimpaired.

BURMA MINES LIMITED

reports that the operations of

BURMA CORPORATION (1951) LIMITED

for the Quarter ended March 31, 1961 resulted in an estimated **Net Profit** of **K.75,900 (£5,692).** The estimated Loss for the NINE months to that date, after charging depreciation, is **K.8,16,900 (£61,268)** compared with a profit of **K.34,99,000 (£262,425)** (on which estimated Taxation was **K.17,82,000 (£133,650)**) in the corresponding period of the previous year.

Details of Revenue, Expenditure, Ore Extraction and Production may be obtained from Central Registration Limited, 9 Basinghall Street, London, E.C.2, upon application.

Additionally the Board of Burma Corporation (1951) Limited states :—

"The dismantling of No. 1 Winder at Marmion Shaft and work in connection with renewing its foundation, referred to in the previous report, commenced early in April, 1961 Subject to there being no unforeseen difficulties encountered, it is hoped that No. 1, Winder will be in operation well within the estimated period of six months. When the Winder is again working every endeavour will be made to increase ore production beyond that obtained previously."

HENDERSON'S TRANSVAAL ESTATES

ALL-TIME RECORD DIVIDEND

The 49th Annual General Meeting of Henderson's Transvaal Estates, Limited will be held on July 12 in London.

The following is an extract from the circulated statement of the Chairman, **Sir Joseph Ball, K.B.E.:**

Although the past year has been dominated very largely by political events and by tension in Africa, so far the only material effect of these factors on shareholders of this Company has been to depress the price of the Company's shares on the London and Johannesburg Stock Exchanges.

At the time of preparing this statement, the shares of your Company stand at 7s. 9d., to give a dividend yield at that price of 11¼ per cent., and yet operations on our mines have continued most successfully; income from our investments has increased; we have sold certain surface and mineral rights at a substantial profit; and on our recently increased capital, which is now £732,000, we are paying an all-time record dividend of a gross amount of £160,000.

Profits of £34,055 were made by Mineral Holdings Ltd. from which the sale of 3,786 acres of surface and mineral rights and a 2,590 acre portion of a freehold farm which was subject to restrictions imposed by its proclamation as a public digging. Shareholders will recall a reference in last year's report to the joint prospecting venture which Mineral Holdings was undertaking in the Transvaal in conjunction with another Johannesburg mining house. The exploratory operations carried out have given a great deal of information on various small mineral deposits, but I regret that nothing was disclosed which warranted further exploitation at the present time. However, in Swaziland, Mineral Holdings is currently testing, on its Havelock Concession, certain asbestos occurrences which do hold out some promise of being of economic value.

The increase of £9,000 in income from investments results largely from higher distributions being received from Whites South African Portland Cement Co. Ltd., and from certain other companies in which we have substantial holdings. As might be expected in view of the market conditions previously referred to, profits from investment realizations at £62,300 have fallen by £15,000 as compared with the previous financial year. I must add that I cannot foresee very much scope for successful transactions occurring in the current year for, as you know, the main part of the group's portfolio—in fact 81 per cent.—is comprised of holdings in companies operating in southern Africa.

You will also see from the consolidated balance sheet how the market value of quoted securities fell by £200,000 over the year, notwithstanding an increase in book value of £66,000. At the end of May, however, the market value at £1,555,000 was still well above the book value of £1,135,000, although there has, I regret, been a further decline in values since the date of the balance sheet. If only the Government in South Africa would introduce a realistic moderation in its racial policy, the present detrimental effect on the confidence of investors would, I am sure, be very largely overcome.

RHODESIAN CORPORATION

MR. C. J. BURNS'S REMARKS

The thirty-fifth annual general meeting of Rhodesian Corporation, Ltd. was held on June 19, in London.

Mr. C. J. Burns, Chairman, presided, and the following is an extract from his circulated Statement: The profit for the year ended September 30, 1960 before appropriation, is £85,237, which is an increase of £4,168 over the comparable figure for last year. It has been considered prudent to provide for certain contingencies, in particular resulting from the recent closure of the Fred and Redwing Mine. Although there is sufficient profit available thereafter to permit the payment of a dividend to shareholders, the Directors have considered that such a payment is not at the present time in the best interests of the Corporation, having regard to the current political and economic uncertainties in the Federation and to the need to conserve the Corporation's cash resources in such conditions.

It will be noted that the quoted investments at September 30 last showed an appreciation of £116,177 over the book cost of £505,337. Since that date considerable profitable realizations have been effected, with the result that at the present time our quoted investments have a book cost of £471,227 and show an appreciation of £54,903.

Chairman's additional remarks

The Chairman, in the course of addressing the meeting, said: To obtain a better appreciation of the Rhodesian political and economic situation I recently paid a visit to Southern Africa. Members will obviously expect me to translate my impressions into prospects for this Corporation. First and foremost, this current year climatically has been an excellent one for agriculture. The maize yield should be of a high order and a reasonable profit on our maize growing activities is expected.

For the same climatic reasons the tobacco crop should also be an excellent one. Although the annual changes in the preferences of the major tobacco leaf purchasers at the Auction make for uncertainty, nevertheless the total crop purchase from our estates should be good and should materially contribute to our revenue.

The interest we have in Rhodesian Brick and Potteries Company is one from which we must, for the moment, expect little return for one of the major casualties of the recession has been the building industry. Nevertheless, however small comfort it may seem to be, the efficiency of the management of that Company has ensured that in this most difficult period operations are still being conducted profitably. Unit cost of production has been reduced and activities in both the Bulawayo and Salisbury brick works have been diversified so as to take advantage of such demand as exists. It is by no means certain that the brick works will, in the course of the next 12 months, receive sufficient orders to enable them to revert to full scale production but, by reason of their efficiency in operation and production methods, both works are well placed to take immediate advantage of any upturn in demand when it arises.

York House, Bulawayo, has, in its turn, suffered from the general recession. At the present moment very few organizations in Bulawayo are contemplating a move to more agreeable premises, nor is there the inflow of business organizations of a few years ago. Consequently, York House is not at present fully let but present rents are sufficient to ensure a small net profit and any recovery in the economy in the Federation will be reflected in increased lettings. In view of impending political uncertainties your Directors decided earlier this year to pay off the overdraft created to assist in financing the building of York House. As a result, the Corporation's investment portfolio has been reduced with the result that all loans have been extinguished and our assets are unencumbered.

It was most unfortunate that at a time of political uncertainty, economic recession and after a protracted drought, that mining conditions in the main section of the Fred and Redwing Mine should become dangerous and render uneconomic the continuance of operations. The decline in payability had been giving cause for concern and a limited programme of exploration had been decided upon to ascertain whether payable values re-occurred at depth. Following the severe fall of ground in January 1961 this programme had to be abandoned. The Mine has now been placed on a reclamation basis and sales of stores are proceeding.

Having reviewed the various aspects affecting our fortunes and dwelt at some length on present difficulties of the country I would like to end on a note of optimism, as far as this Corporation's fortunes are concerned. We have experienced a most difficult year with a combination of adverse conditions all coming at one time. We have prudently faced up to the realities of the situation as evidenced by the Accounts now before us even though it meant that most reluctantly no dividend recommendation could be made. However, it is my belief, with the information already available on operations for the current year, that subject to no untoward circumstances a resumption of dividend payments in respect of this year will be practicable.

The report and accounts were adopted.

WESTERN SELECTION & DEVELOPMENT

MR. C. J. BURNS'S STATEMENT

The thirty-first annual general meeting of Western Selection and Development Co., Ltd., was held on June 16 in London.

Mr. C. J. Burns, Chairman, presided, and the following is an extract from his circulated Statement.

Members will have noted from the Report of the Directors that changes in the operation of the Company have been proposed following the successful offer made by Philip Hill, Higginson, Erlangers Limited on behalf of the Ghana State Mining Corporation to purchase shares of certain mining companies operating in Ghana.

The profit for the year ended September 30, 1960 amounting to £165,982 was not affected by this offer and represents an increase of £32,115 over that of the previous year. Opportunity has however been taken in the Accounts to revalue the holdings of the Company recently taken over by the Ghana State Mining Corporation and the resulting surplus of £265,862, together with the balance brought forward from the previous year of £90,415, make available a total of £522,259, from which sum an appropriation of £430,098 has been made against shares in and advances to Canadian prospecting and mining companies.

Your Directors recommend a dividend of 8%, less income tax, and, subject to the confirmation of the Court, a further distribution by way of return of capital equivalent to 1/- per unit of stock.

This Company's business has, in the past, been concerned mainly with the acquisition, development and promotion of gold mining properties in West Africa. The records show how successful over the years these activities have been, and how much this Company has directly and indirectly assisted in the development of Ghana.

Of recent years, due to rising costs, particularly wages, and the unrealistic price received for gold, mining operations have been made acutely difficult. The offer made on behalf of The Ghana State Mining Corporation was considered to be fair and reasonable and your Directors accepted and, as a result, the Company has received £678,000.

At the present moment it is still too early to make a complete appraisal of the possibilities of future mining operations in Canada, and accordingly a reserve has been provided to cover all prospecting work to date.

Policy

In recommending a distribution of 1/- per Unit of Stock by means of a capital reduction scheme, your Directors have given careful consideration to their future policy for the Company. Over the past few years the Company's portfolio has been gradually strengthened by the purchase of investments outside Ghana. This has been successful to the extent that the Company's quoted investments currently have a market value in excess of £450,000, in addition to which is the cash received from our Ghana holdings.

It is the policy of your Directors to concentrate on investment within the United Kingdom and should favourable opportunities arise, direct interests will be taken in suitable industrial and commercial undertakings.

The report and accounts were adopted.

DIRECTORATE OF OVERSEAS GEOLOGICAL SURVEYS: SENIOR SCIENTIFIC OFFICER. Pensionable post in Tolworth, Surrey, for man aged (normally) at least 26 on 31.12.61. Qualifications: 1st or 2nd class honours degree in Geology or Mining Geology (or equivalent), or high professional attainment, and at least 3 years' appropriate post-graduate or other approved experience. Experience of geological mapping in overseas territories and of photogeological technique essential. Interim salary scale £1,392-£1,714. Starting salary may be above minimum. Promotion prospects. Write Civil Service Commission, 17 North Audley Street, London, W.1 for application form quoting *S/5326/61*. Closing date July 14, 1961.